NOVEMBER 2022

JAH

Digital International Journal of Architecture, Art & Heritage

Volume 1
Issue 2

e-ISSN: 2822-437X

NOVEMBER 2022

JAH

Digital International Journal of Architecture, Art & Heritage

‘Heritage’ Issue

www.aybu.edu.tr/jah
www.dergipark.org.tr/en/pub/jah

Volume 1
Issue 2

e-ISSN: 2822-437X

Digital International Journal of Architecture, Art & Heritage
Volume **1**, Issue **2**, November **2022**

Editor's Message

This November 2002 issue of JAH - Digital international journal of Architecture Art Heritage, is the first dedicated specifically to Heritage topic. As scientific committee's member and editorial chief of this issue, I collaborated with my colleagues at AYBU Ankara Yıldırım Beyazıt University to select and review editorial proposals that could be most representative of such a broad topic as cultural heritage.

In this regard, the journal's scientific committee and I are pleased to host within this issue two articles reporting on highly contemporary and topical issues addressing international cases at the centre of ongoing research and current debates. Firstly, the essay proposed by Niccolò Pozzi and Matteo Barisone concerning the case of Cuba, stands as a compelling testimony of the research initiated by the two young Italian scholars who recall the importance of adequately framing and reflecting on the values of space in the contemporary city, especially on a complex context such as that of the city of Havana city in Cuba. Similarly, Selma Harrington, Adi Ćorović and Ahmed Obralić present in this editorial the first important fruits of profound and essential research they have been engaged in recent years concerning the modernist architecture of the city of Sarajevo. This essay stands as a landmark for studies towards Bosnian architecture and a fundamental key to understanding the historical stages of development of the history of architecture in Bosnia and Herzegovina and the Balkans in general.

A third contribution that insists on the importance of finding the appropriate attention towards the past and heritage, in general, is the one selected and proposed by Fatma Köse and Cengiz Şahin. Reflecting on the birth, use and development of the Cintamani motif, the authors induce reflection on the importance of understanding history for the actuality and future transformations of decorative and architectural elements.

Further contributions insist on the importance of applying new and innovative technologies towards heritage, either for its greater understanding or for digitisation functional to a better experience and knowledge. The essay proposed by Tarık Serhat Bozkurt analyses historic spaces, particularly the Faculty of Science and Letters Building from an acoustic perspective, studying innovations and design dynamics through the study of sound. The article by Ali Akif Yörük, Muhammed Abdullah Bülbül and Salah Hajismail, on the other hand, recalls the importance of digitisation of heritage for its proper preservation, reiterating the importance of this field of study and research not only from a current perspective but also from a future perspective. Finally, the journal hosts an Arabic translation of a research paper published a few years ago on Syrian heritage at risk and the opportunities for intervention in a fragile heritage tested by war and years of armed conflict.

All these essays reaffirm the importance of the theme of heritage in the contemporary world and reaffirm it in its many facets as a fundamental step of knowledge, study, research and enhancement of the modern aimed at a better development of tomorrow's architecture.

Assoc. Prof. Dr. Emanuele MOREZZI
Issue Editor

Digital International Journal of Architecture, Arts & Heritage (JAH) is a scholarly peer-refereed journal serving the needs and goals of development and resilience in Architecture, Arts and Heritage-related fields, which is published each two months (6 issues per year) and digitally. Our journal is open access and accepts articles in English, Turkish and Arabic. Submissions from the fields Industrial Design, Interior Architecture, Architecture, Landscape Architecture, Urban and Regional Planning, Traditional Turkish Arts, Plastic Arts, Design, Movable Cultural Heritage/Art Works Restoration and Conservation are accepted to our journal. JAH publishes original research papers, state-of-the-art review papers, novel industrial applications, and insightful case studies in a broad scope of topics related to these disciplines.

Webpage
https://aybu.edu.tr/jah
https://dergipark.org.tr/en/pub/jah

Publisher
Ankara Yıldırım Beyazıt University

Editor-in-Chief
Prof. Dr. Salah HAJISMAIL

Redaction / Layout Editing
Necmettin SANCAK
Tülay ZIVALI

e-ISSN: 2822-437X

Content

SARAJEVO HERITAGE FLASHBACK: Modernizing Trends in Architecture of Bosnia and Herzegovina at the Beginning of the 20th Century 1

Selma HARRINGTON, Adi ĆOROVIĆ, Ahmed OBRALIĆ

Cuban Heritage: The Architecture of the revolution 37

Niccolò POZZI, Matteo BARISONE

3D Architectural Heritage Platform 65

Ali Akif YÖRÜK, Muhammed Abdullah BÜLBÜL, Salah HAJISMAIL

Meeting Room Acoustic Design in the Historical Building: The Example of Istanbul University Faculty of Science and Letters Building 91

Tarık Serhat BOZKURT

Çintamani Motifinin 21. Yüzyıl Tezhip Eserlerinde Kullanımı 131

Fatma KÖSE, Cengiz ŞAHİN

الحفاظ أم إعادة الإعمار بعد الصراع: تحليل معايير وقيم التراث الثقافي السوري 157

Salah HAJISMAIL, Emanuele Morezzi

Journal of Architecture, Arts and Heritage (JAH) – Vol. 1, Issue 2, November 2022
e-ISSN: 2822-437X

SARAJEVO HERITAGE FLASHBACK: Modernizing Trends in Architecture of Bosnia and Herzegovina at the Beginning of the 20th Century

Dr. Selma Harrington[1]
Architect, Researcher and Policy Analyst
harrinse@tcd.ie
ORCID No: 0000-0002-2936-6482

Dr. Adi Ćorović[2]
International University of Sarajevo, Bosnia and Herzegovina
acorovic@ius.edu.ba
ORCID No: 0000-0003-0775-0587

Dr. Ahmed Obralić[3*]
International University of Sarajevo, Bosnia and Herzegovina
aobralic@ius.edu.ba
ORCID No: 0000-0002-1494-1173

Submission Date: 11.11.2022 / Acceptance Date: 17.11.2022

ABSTRACT

This paper brings to light some more recent and previously inaccessible documents from the Commission to Preserve National Monuments of Bosnia and Herzegovina, focusing on the selection of buildings listed as national heritage which signal the early modernism in the first decades of the 20th century, bridging across historic periods of significant political and administrative changeover. Cross-referencing the previous studies of architectural developments, the paper contributes to a holistic understanding of the unique and elusive regionalist vocabulary, culture of building and treatment of heritage, seen as vitally relevant to today's planning and development of the city. It advances the critical heritage discourse in examination of the architectural synergies among the European styles implanted within the older Ottoman heritage and the modernizing trends expressed in the works of the first indigenous architects in Sarajevo, Bosnia and Herzegovina, at the beginning of the 20th century. Mindful of the pressures and complexity of international and local investment in a post-conflict country, often oblivious to the long-term environmental impact, the paper

* Corresponding author.

highlights the trends from the past which are relevant for today. It argues for the holistic and cross-disciplinary approach within architecture and urban planning professions in charge of care for heritage, leading to the culture of building with a quality approach to assumptions, interpretations and expressions of local spatial identity, in the shadow of the mainstream European trends. Within the limit of architectural appraisal, the investigation points to a poor physical condition of many of the historic buildings, often aggravated by the complicated ownership issues or unattended war damage, as well as limited scope of protection and rehabilitation under the Commission's remit. The paper points to the areas of potential engagement by professionals, academia and civil society in Bosnia through study, customized architectural heritage tours and preservation campaigns, which in the past succeeded in raising the awareness and documenting heritage.

KEYWORDS
Commission to Preserve National Monuments of Bosnia and Herzegovina, critical heritage discourse, modernizing trends, Sarajevo, post-conflict.

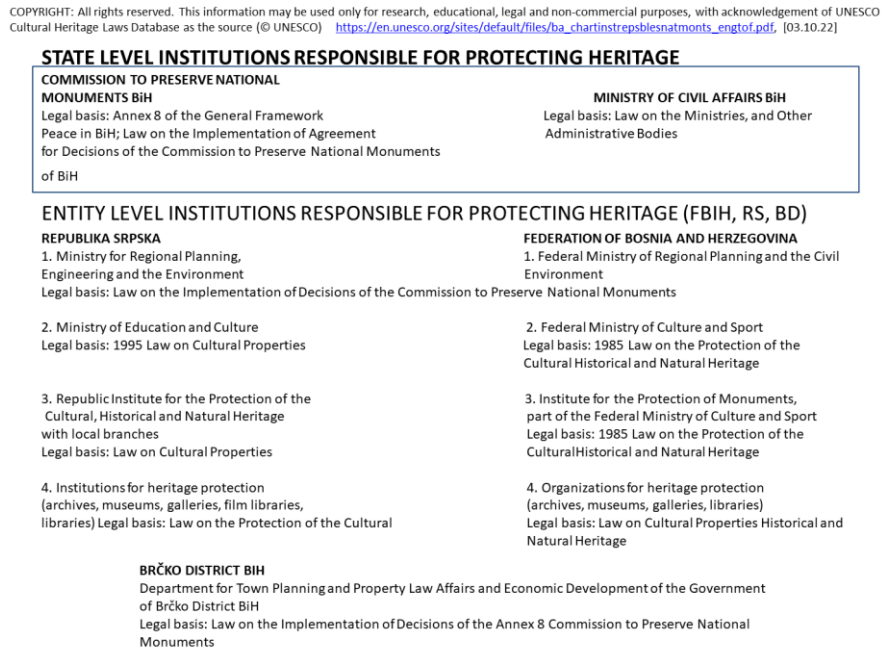
FRAMING THE HERITAGE CULTURE IN BOSNIA AND HERZEGOVINA

The critical heritage studies approach calls for the inclusion of socio-political perspectives and an engaged dialogue with the conservation practices, arguing also for the pursuit of a post-western perspective in the field (Waterton, 2010; Winter & Waterton, 2013: 529; Winter, 2013: 536). Inspired by such concepts, this paper gazes back to the formative architectural periods of Sarajevo tracking the imprints of evolution of attitudes towards built heritage on selected buildings. These small signifiers within the architectures of historicism, through to the works of the first generations of indigenous architects and their legacy of the Sarajevo's Modern(a), allow for a fresh review of the unique Bosnian form of regional internationalism. Such review is necessary for a small, post-conflict environment and region which struggles to define itself within its immediate neighborhood, towards the EU and other international relations. The lessons of cultural understanding, accommodation and integration from the past could help better manage the actions for social, cultural and economic sustainability at present, leading to alignment with the international actions on the pressing issues of climate change, digitalisation, energy and resource security.

Sarajevo's post-war built environment bears witness of experimentation, setbacks and resilience, which could in today's architectural parlance, be interpreted as an encounter and sometimes a clash of placemaking concepts. Placemaking is a term integrated in some national architectural policy documents and understood as a process (which has to) take account of the economic, planning, architectural, engineering, environmental, landscape and community development challenge (Government of Environment Ireland, 2009). The city's development therefore, has to be appraised through historic continuities and systemic ruptures (Harrington et al., 2019) which are visible and legible in its architecture but often analysed in a fragmented way with silence about the gaps. Visually, Sarajevo's built fabric can be read almost as a linear display of architectural historic styles which also show and disguise the historic systemic changes and collapse(s), including the targeted destruction of built heritage in the 1990s war. Much of the recent international research approach Bosnia through a post-conflict and cultural history lens, discussing it through the concepts of 'othering', orientalising or a post-colonial discourse (Donia 2007; Feichtinger & Heiss 2013; Hartmuth, 2015; Ruthner, 2018). Othering is also defined as a set of dynamics, processes, and structures that engender marginality and persistent inequality across any of the full range of human differences based on group identities (Powell & Menenian, 2016). It is elaborated more specifically on how "othering" constructs a negative and repulsive image of an antagonist as fundamentally different or alien; the better to fashion a positive and attractive image of yourself or your group. The term is widely used to analyse imperial, colonial, racist and sexist stereotypes in justifying hierarchies of conquest and power (Gillespie, 2020). The domestic literature and architectural research expose the generational gaps in examination of the built environment and architecture, with some excellent older sources and monographs on the specific periods. The architectural history research has been facilitated by several solid domestic historical sources on the Ottoman and Austro-

Hungarian periods of governance (Kruševac, 1960). It has been carried out by art and architectural historians mostly from academia, during and after the socialist period (Krzović, 1987, 2004; Milošević, 1997; Kurto, 1998; Štraus, 2006), some of it published post mortem (Husedžinović, 2020).

The institutional care of heritage protection (and rehabilitation) has undergone a major overhaul since the socialist period and after the 1990s war, with a complicated and fragmented structure of delegation among the federal entities (Bosnia and Herzegovina has two entities: Federation of Bosnia and Herzegovina and Republika Srpska, and, Brčko District, as an autonomous administrative region), cantons and municipalities (79 in FBiH and 64 in RS). Figure 1 and Figure 2 give an overview of the delegation of responsibilities for heritage, nominally under the umbrella of the Commission to Preserve National Monuments of Bosnia and Herzegovina.
This state body is established under the Annex 8 of the General Framework Agreement for Peace signed in Dayton (1995) with a task to record and protect national heritage, which was recognized as a vital element of reconciliation and return of population (Dayton agreement, 1995). The scope of the Commission's work relates to declaration and register of national monuments, including sites, natural/urban/architectural assembles, immovable and movable heritage of historical and cultural importance to the whole country. At the top of its structure are three expert members representative of the three main ethnicities, which, with some concern, have replaced the earlier composition which included four other international experts. This group provides guidance on the inclusion on the list of national monuments in collaboration with the executive structure of the Commission in charge of administrative management and technical expertise. There are currently ten advisers employed to manage the built heritage database, one those being among the authors of the paper.



STATE LEVEL INSTITUTIONS RESPONSIBLE FOR PROTECTING HERITAGE

COMMISSION TO PRESERVE NATIONAL MONUMENTS BiH
Legal basis: Annex 8 of the General Framework Peace in BiH; Law on the Implementation of Agreement for Decisions of the Commission to Preserve National Monuments of BiH

MINISTRY OF CIVIL AFFAIRS BiH
Legal basis: Law on the Ministries, and Other Administrative Bodies

ENTITY LEVEL INSTITUTIONS RESPONSIBLE FOR PROTECTING HERITAGE (FBIH, RS, BD)

REPUBLIKA SRPSKA
1. Ministry for Regional Planning, Engineering and the Environment
Legal basis: Law on the Implementation of Decisions of the Commission to Preserve National Monuments

2. Ministry of Education and Culture
Legal basis: 1995 Law on Cultural Properties

3. Republic Institute for the Protection of the Cultural, Historical and Natural Heritage with local branches
Legal basis: Law on Cultural Properties

4. Institutions for heritage protection (archives, museums, galleries, film libraries, libraries) Legal basis: Law on the Protection of the Cultural

FEDERATION OF BOSNIA AND HERZEGOVINA
1. Federal Ministry of Regional Planning and the Civil Environment

2. Federal Ministry of Culture and Sport
Legal basis: 1985 Law on the Protection of the Cultural Historical and Natural Heritage

3. Institute for the Protection of Monuments, part of the Federal Ministry of Culture and Sport
Legal basis: 1985 Law on the Protection of the CulturalHistorical and Natural Heritage

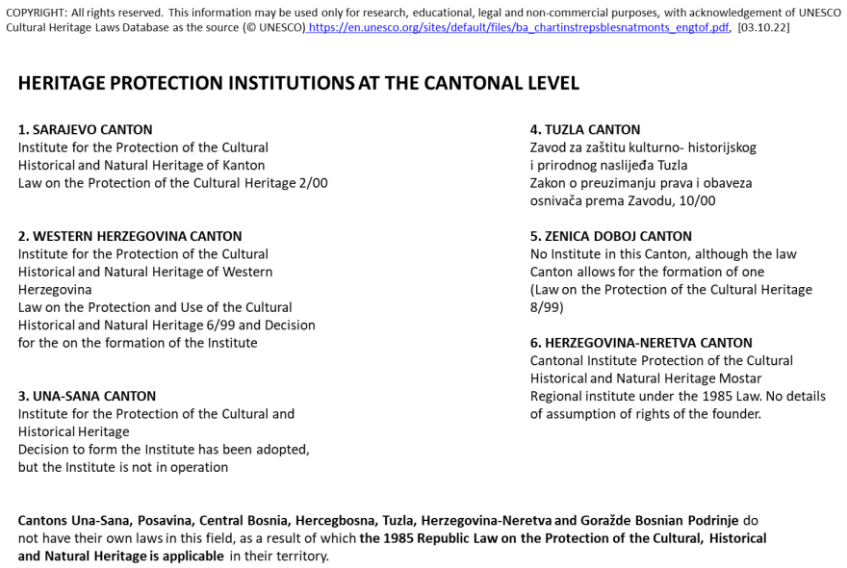
4. Organizations for heritage protection (archives, museums, galleries, libraries)
Legal basis: Law on Cultural Properties Historical and Natural Heritage

BRČKO DISTRICT BIH
Department for Town Planning and Property Law Affairs and Economic Development of the Government of Brčko District BiH
Legal basis: Law on the Implementation of Decisions of the Annex 8 Commission to Preserve National Monuments

Figure 1. *Institutions responsible for protecting heritage in Bosnia and Herzegovina-State and entity levels.*

Bosnia and Herzegovina is a signatory of several international conventions concerning heritage and the Commission's criteria follow the principles of the international charters (URL-1) but there is still a long way to depoliticise and professionalise the heritage management, and capitalise on the academic and public engagement. Other countries, such as Ireland, with comparable historic experiences of colonialism, conflict and conflicted heritage could potentially provide a valuable experience in compiling a modern, digitalised, accessible and user-friendly open source with inventory which engages professionals, academia and public to partake in care for heritage. National Inventory of Architectural Heritage (NIAH) is an initiative of the Government of Ireland as part of its commitment to Granada Convention signed in 1985. It was legislated in 1999 as part of the

Planning and Development Act 2000, with over 65000 digitalised records for buildings and gardens (URL-2).



COPYRIGHT: All rights reserved. This information may be used only for research, educational, legal and non-commercial purposes, with acknowledgement of UNESCO Cultural Heritage Laws Database as the source (© UNESCO) https://en.unesco.org/sites/default/files/ba_chartinstrepsblesnatmonts_engtof.pdf, [03.10.22]

HERITAGE PROTECTION INSTITUTIONS AT THE CANTONAL LEVEL

1. SARAJEVO CANTON
Institute for the Protection of the Cultural Historical and Natural Heritage of Kanton
Law on the Protection of the Cultural Heritage 2/00

2. WESTERN HERZEGOVINA CANTON
Institute for the Protection of the Cultural Historical and Natural Heritage of Western Herzegovina
Law on the Protection and Use of the Cultural Historical and Natural Heritage 6/99 and Decision for the on the formation of the Institute

3. UNA-SANA CANTON
Institute for the Protection of the Cultural and Historical Heritage
Decision to form the Institute has been adopted, but the Institute is not in operation

4. TUZLA CANTON
Zavod za zaštitu kulturno- historijskog i prirodnog naslijeđa Tuzla
Zakon o preuzimanju prava i obaveza osnivača prema Zavodu, 10/00

5. ZENICA DOBOJ CANTON
No Institute in this Canton, although the law Canton allows for the formation of one
(Law on the Protection of the Cultural Heritage 8/99)

6. HERZEGOVINA-NERETVA CANTON
Cantonal Institute Protection of the Cultural Historical and Natural Heritage Mostar
Regional institute under the 1985 Law. No details of assumption of rights of the founder.

Cantons Una-Sana, Posavina, Central Bosnia, Hercegbosna, Tuzla, Herzegovina-Neretva and Goražde Bosnian Podrinje do not have their own laws in this field, as a result of which **the 1985 Republic Law on the Protection of the Cultural, Historical and Natural Heritage is applicable** in their territory.

Figure 2. *Institutions responsible for protecting heritage in Bosnia and Herzegovina-Cantonal level.*

Overall, in the 20 years since the establishment, within the complexity of the post-conflict governance, technical and financial limitations, the Commission and its team have made a significant progress in compiling the data and lists of protected structures, animating foreign donations and facilitating rehabilitation of heritage buildings and sites. Its work is complicated by the gaps in local and regional area planning strategies and undermined by the lack of technical means to produce accurate survey information, drawings database and photographic records. The research undertaken internally is of limited scope. However, the existing Commission's archive is a good base for further research to document, appraise and consolidate the information on the built heritage leading to the full inventory in the country. It's work and remit points to the

opportunities and pathways for external engagement and collaboration, to which this paper seeks to contribute.

FACETS OF HISTORICISM IN BOSNIA

The four centuries of Ottoman cultural dominance marked Sarajevo and other Bosnian towns mostly as provincial trading centres, but following the Austro-Hungarian Occupation in 1878 and subsequent Annexation of Bosnia in 1908, they undergo a rapid transformation. A standard primary reference for the intense building activity and architecture of this period is the original research by an art historian Ibrahim Krzović (1987; 2004). In his view, the first thirty years the Austro-Hungarian administration (and its architects) largely ignored the values of the existing built heritage in the country, which only more-or less changed towards the end of the rule. The change manifested in the application of the stylistic elements on the building facades, perceived to be sympathetic to the Bosniaks and Islamic architecture of the place.

Krzović (1987) illuminates three broad stylistic architectural trends evident in the buildings of the period: *historicism, secession* and *search for Bosnian style* Compared to the historicist styles that dominated architecture across Europe at the time, historicism in Bosnia stands out by its various facets, from neo-renaissance, neo-gothic and romanticism, to pseudo-Moorish. These variations emerged concurrently during the three decades of intensive construction and were embodied in many works of the two most prolific architects of the period, Karl Paržik and Josip Vancaš whose contribution is well documented in the regional research (Božić, 1989; Dimitrijević, 1991). Whilst it was actively promoted in Bosnia, there was a general departure from historicism in European centres in favour of functionalist trends in architectural design and construction (Krzović, 2004). The "pseudo", the term used for this style in Bosnia up to the 1990s or "neo-Moorish" style was perceived to be culturally compatible with the Bosniak cultural traditions. The neo-Moorish forms of historicism

demonstrated the intention by the imperial authority to appeal to the Bosnian majority Muslim population (Kraljačić, 1987; Odluka KONS, 2006). This variant of historicism was typically articulated as an eclectic composition of elements from the Northern African Islamic architectures and applied in many large public buildings throughout Bosnia. The most prominent example of this style is Sarajevo's Vijećnica (1896), designed by Aleksandar Wittek and Ćiril Iveković. Vijećnica was severely damaged during the targeted destruction of Sarajevo's infrastructure in 1992 and fully reconstructed in 2014, with the help of international donors. Other lesser-known examples are the Town Hall in Brčko (1892) designed by Iveković, Gimnazija in Mostar (1898-1902) designed by František Blažek, and Madrasa, as Islamic school in Travnik (1895) designed by Iveković and Wittek (Pašić, 2015: 18).

According to Krzović (2004: 156) the Islamic religious buildings from the same period remained devoid of the neo-Moorish appearance, possibly due to the fact that they were often built without architect's input and relied on the traditional skills of local craftsmen who followed geometric forms inherited from the Ottoman period. In the design of Ulema Medžlis Palace from 1910, architect followed the design principles and proportions of the original building in the Ottoman tradition, rather than the imported motives from far-away Islamic lands (Krzović, 2004). The neo-Moorish stylistic trend steadily declines after the 1900s, with some notable exceptions, such as the Public Bath (1913-14) in Musala ulica in Mostar, designed by Rudolf Tönnies and the Ashkenazi Temple in Hamdije Kreševljakovića ulica in Sarajevo, designed by Wilhelm Shiassny (1896) and completed by Karl Paržik (1902) (Krzović, 2004: 148-155). The fact that the Ashkenazi Synagogue and other public or educational buildings featured elements of the neo-Moorish destabilises the argument that this style was a result of an overarching intention to express the Bosnian (or Bosniak) identity through architecture. Instead, it supports the views that this was driven more by capitalism in general (Hartmuth, 2018) or a fascination of

the European elites elsewhere with Islamic, Byzantine and Asian architectures (Pašić, 2015), as evident, for example, in the Indo-Saracen design of the Royal Pavilion in Brighton (1815-1822) (Historic England, 1998).

SECESSION AND THE SEARCH FOR BOSNIAN STYLE (BOSANSKI SLOG)

As the Secession in art and architecture emerged in the Habsburg metropolis Vienna towards the end of the 19th century as a rejection of academism, similar ideas began to resonate with many professionals, architects, engineers and technicians who came to work and settle in Bosnia from other provinces of the Austro-Hungarian Empire. There was a technical personnel who arrived in Bosnia firstly as part the military engineering crews in 1878 and then gradually as entrepreneurs or civil service employees in the new governing structure. They originated from Austria, Hungary, Moravia, Czechia, Slovakia, Galizia (Poland), Croatia and Slovenia. Only a small proportion of technical cadre was born in Bosnia. They were sometimes perceived pejoratively by the locals, who labelled them colloquially as "kuferaši", or "suitcase architects" (Krzović, 2004). By then, Sarajevo and other urban centres have undergone an extensive transformation fuelled by the opportunities for profit and development and the self-proclaimed civilizing mission of the Habsburg Empire (Kruševac, 1960; Donia, 2007; Ruthner, 2018). The scale of change had a profound impact on the integrity, value and quality of the older built context in Bosnia. Only belatedly, some architects began advocating the need to protect and preserve the uniqueness of place and to halt the damage and loss to local heritage.

Exceptionally, the sketches by Viennese architect Ernst Lichtblau, show deeper sensitivity and appreciation of the local vernacular architecture. A disciple of Otto Wagner, he undertook a sort of a gentleman's *grand tour,* visiting small Bosnian towns and making records of "the cascading and

cubic forms of roofs, simple and strong house forms, modelled with light and with fine tones of black, white and brown colours" (Krzović, 2004: 191-192). Among these there are recognizable contours of the Bosnian Medieval capital Jajce as well as studies of house forms and typologies and first conceptualisation of new house types derived from traditional architecture. The developed house type concept by Lichtblau, incorporates all the components of the old architecture conceived with a contemporary functional construction and carefully landscaped surroundings. While the house design respects the traditional vertical distribution of a two-storey space, with a high-pitch pyramidal roof and sympathetic proportion of fenestration, the drawing style and presentation are executed in a typical manner of a pure, highly stylised Secession, characteristic for the Wagner School. Lichtblau's standalone project for a Bosnian house from 1904 might be considered as an initiation of the Bosnian Style (*bosanski slog*) which predates Josip Vancaš's formal initiative and definition.

In 1911, architect Vancaš, supported by a group of architects, formally petitioned the Bosnian Council in Sarajevo, stating the importance of the older Bosnian built heritage and calling for its adequate survey, recording and protection. This included a proposal for a regulation of types of permissible interventions within the existing ensembles, and request for a provision of preferential treatment through financial incentives and tax relief for new structures to be built in the Bosnian Style (Krzović, 2004: 189-190; cf. Vancaš, 1928). In reality, this significant and innovative motion was a belated initiative (Imamović, 2013: 123) with little impact on regulation and practice, other than prompting the architect Josip Pospišil to complete the survey and record of several older structures in Herzegovina (Harrington, 2019). There were older surveys of Bosnian towns initiated by military campaigns and administration's eagerness to document the newly acquired land, for example, Edmund Stix (1887: 18-19) provided one of the first traditional house surveys from Bosnia and Herzegovina after the Occupation by the Austro-Hungarian monarchy in 1878, showing the

ground and first-floor plans of the Sadullah Eff. Šabanović's house in Sarajevo (Arnautović, 1984). At least among a few prominent architects of the Monarchy, such was architect Dr Hans Berger, who joined the Construction Department of the Government, Zemaljska vlada before World War I, this showed a heightened sensitivity and respect for the local urban forms, with some attempts to express these in the design of new buildings, most notably in projects by Vancaš, Pospišil and Rudolf Tönnies, just before the outbreak of World War I. More than a hundred years on, this is now echoed in the Davos Baukultur Quality system, which includes the categories of context and sense of place among the eight proposed quality criteria. "The Davos Baukultur Quality System proposes a multidimensional approach to defining the holistic concept of high-quality Baukultur and to assess the Baukultur quality of places. It is a contribution to the ongoing Davos Process, which began in January 2018, when the European Ministers of Culture adopted the Davos Declaration "Towards a high-quality Baukultur for Europe". The Davos Declaration stresses the central role of culture for the quality of the built environment. Baukultur encompasses all activities with spatial impact, from craftsmanship details to large-scale urban planning and development of landscapes. The present paper builds on the Davos Declaration and deepens it in a scientific and political discourse.

According to Krzović (2004: 193), the Hotel Stari Grad building (1909) in Mula Mustafa Bašeskija ulica in Sarajevo, likely to be Pospišil's design, is the first to confidently articulate the Bosnian Style (Odluka KONS, 2008a). Originally this building was built as travellers' accommodation (Han) for the Gazi Husrev-Bey's Waqif, judging by the façade drawings and similar elements noted in his other projects, it was most likely designed by Josip Pospišil (Krzović, 2004). This three-bay corner infill building features an undulated two-storey central bay-window and veranda suspended over the recessed street entrance level. The spatial distribution and materialisation

draw direct inspiration from the traditional Bosnian Ottoman architecture, still legible at the near-by hilly neighbourhoods of Logavina and Kovači ulica (Fig. 3).

Figure 3. *Hotel Stari Grad, Mula Mustafe Bašeskije ulica, Sarajevo (1909) (The Commission to Preserve the National Monuments of BiH, 2018).*

Two other projects by Pospišil from 1912, which have been recently listed as National Monuments of Bosnia and Herzegovina, deserve some more scrutiny here. Both were submitted for publication in the Viennese technical journal *Der Bautechniker XXXII* the same year, thus signaling the innovative trends of architectural practice in Bosnia. On the one hand, the designs were rooted in the local tradition (Hrasnica, 2003: 161), and on the other, in the new functionalism, thus displaying the evolution of the concept of "modern", understood as "the consciousness of an epoch that relates itself to the past of antiquity, in order to view itself as the result of a transition from the old to the new" (Habermas & Ben-Habib, 1981).

The first project, the Fire Brigade Station (1912) in Sarajevo is ambitiously modern for its time, with the prominent structural façade brick-clad columns stretching from the ground up to the roof soffit and abstracted

minimal decoration, making a token reference to the design vocabulary of the Bosnian Ottoman heritage. The building was modelled on the similar structure in the 10th municipal district of Vienna (Hrasnica, 2003: 161), with the pioneering use of the reinforced concrete ceiling and construction details which anticipated modernist methods. The morphology and functional design of the building resulted from the creative experimentation with "a simple cubic form […] and visible vertical structure comprising the simple brick-clad pilasters stretched from the ground up to roof level" (Bakrač, 1979; Krzović, 2004: 180-181; Odluka KONS, 2008e; Husedžinović, 2020: 1015-16). Somewhat over-enthusiastically, Hrasnica opined: "The pronounced wreath-reminiscent external walls, and particularly the shallow-relief geometric decoration of wall cassettes which delineate the fenestration, suggest that the designer sought the support in the Secession while opening a dialogue with the surrounding environment by a timber oriel situated on the western elevation, inspired by the *divanhana* of the Bosnian Ottoman house" (Hrasnica, 2003: 161-162) (Fig. 4a and 4b).

a  b 

Figure 4a. *The Fire Brigade Station (1912), corner Hamdije Kreševljakovića,* **4b**. *Fehima efendije Čurčića ulica, Sarajevo (Source: Hrasnica, M. (2003). Arhitekt Josip Pospišil: život i djelo. Sarajevo).*

Divanhana (Slavenised Turkish) is typically a semi-open part of the Bosnian Ottoman house, formed from structural timber as a bulk which projects from the façade, allowing view and ventilation to the inside, but privacy

and screening from the outside (Arnautović, 1984). Oriel, on the other hand, features both in Islamic and western architecture, generally as a smaller box-type bay window located in higher position on the main façade or corner of building.

The second project published by Pospišil advances the Bosnian Style further, featuring an elegant three-storey residential block for the Hadim Ali Pasha Waqif (Odluka KONS, 2007), which is located opposite of the former Provincial Government complex. Its steep roof pitch, in a mixture of Alpine and Central Bosnian tradition, a two-storey bay-window and veranda facing Mis Irbina ulica, with subtle references to proportions and fenestration rhythm of the Bosnian Ottoman house, demonstrate a transposition of its volumetric principles into a multi-unit four-bay rental apartment block (Fig. 5).

Figure 5. *Hadim Ali Pasha Vaqif Building, corner Džemaludina Čauševića and Mis Irbina ulica, Sarajevo (The Commission to Preserve the National Monuments of BiH, 2019).*

Both examples give clues that the Bosnian Style formally might have emerged through the evolution of the Geometric branch of architectural Secession combined with the functionalist principles. Conceptually, its significance lays in the heightened awareness of the regional cultural context and subsequent integration of its elements in the new architectural language with a reductionist modernist approach. Regarding the impact on the urban environment, such processes predate the considerations for

genius loci, or a sense of place and placemaking, as emerged in the more contemporary parlance.

The Bosnian Style was not limited to Sarajevo, as can be seen in the architecture of the local branches of the Zemaljska Banka, designed by Vancaš in Derventa, Banjaluka and Bosanski Šamac. Dating back to 1910, this architecture has already moved away from the neo-classic historicist styles but was equally restrained from the over-bearing localism (Kurto, 1998: 265). Kurto deems that the design of such buildings embodied the elemental signifiers of modernism integrating the functional requirements with construction and materialisation, as a carefully calibrated reinterpretation of a regional vernacular tradition. That argument effectively emphasises the significance of these early 20th century modernising experiments and their connection with the mainstream of architectural modernism in the 1920s which resumed after World War I. It is noteworthy, that many of the architects who practiced in Bosnia and Herzegovina were of Czech origin, which paved the way to future synergies and confluence of modernist ideas.

INTERWAR ARCHITECTURE IN SARAJEVO

As part of a newly formed Kingdom of Yugoslavia (1918-1941), which comprised various lands populated predominantly by Southern-Slavs, with a complex mix of Austro-Hungarian and Ottoman legacies, Bosnia and Herzegovina was politically and administratively undermined. The Kingdom proved to be a complicated and unstable political construct. The King's suspension of the Constitution in 1929 and an imposed new administrative-territorial division of the whole country meant that the Bosnian geographic identity was over-ruled for the first time after four hundred years. There was very little state investment in Sarajevo's infrastructure, which became a "forgotten city", almost unchanged since the Hubsburgs left (Donia, 2006: 175; Cf. Spaho, 1927). For example, it was only in 1936 that the High Technical School which trained skilled technicians moved into its purpose-

built new structure in Sarajevo's Marijin Dvor, having operated from various premises since 1889 (Kebeljić, 1991: 104).

However, the first local generations of architects, engineers and technician progressively contributed to the societal, urban and rural transformation in the region. Propelled by the post-war reconstruction and industrial development, the modern movement in architecture in European centres, provided a source of inspiring ideas, new concepts and education for several generations of Bosnian architects who were eager to engage locally upon return from studies abroad. Linked through education and practice to Vienna and Prague, and to a lesser extent the Bauhaus school of architecture, their projects and activity added a new layer to modernisation of the urban environment of Bosnia and Herzegovina.

A detailed survey of the interwar urban and architectural developments in Sarajevo by architect Predrag Milošević (1997), illuminates the work of key personalities tracking the formative influences and connections with Central European centres (Harrington, 2020: 129-132).

THE PRAGUE LINK

The students from Bosnia, with prior training typically at the High Technical School of Architecture in Sarajevo, founded in 1889 (Kebeljić, 1991: 101; Harrington, 2020: 129) could not access the already established schools of architecture in three other centres of Kingdom of Yugoslavia unless they had completed gymnasium (Milošević, 1997: 41) and therefore had to seek further study abroad. The Architecture School in Prague, Českе Vysoke Učeni Technicke, was often preferred destination over Vienna as it proved advantageous to study through another Slavic language. Prague, the capital of another new country that emerged after the collapse of Austria-Hungary, attracted several generations of Bosnian students who could relate with the aspects of transition, accelerating urbanisation and industrialisation in a post-colonial society and gain experience working with Czech practices (Harrington, 2020: 130).

The architectural scene in Prague in the 1920s was dynamic and generally marked by two opposing trends. The proponents of the "Cubist architecture," under the umbrella of the Club for Old Prague, claimed that the modern constructivist architecture could not fit into the existing urban matrix of the city. In opposition, the radical architecture historian Karel Teige, informed by the work of Adolf Loos and Jan Kotera, argued that the members of the Club for Old Prague misunderstood the essence of cubism. For him, the architecture, as a form of construction, was conditioned by purpose and therefore could not tolerate "formalism", but instead, had to be led by "rational forms" (Janković, 2007: 35-40). The extreme form of such thinking, expressed as anti-ornamentalism, provided a theoretical backing for the radical changes to the historic city cores. However, Teige later softened his views (Janković, 2007: 36-37) and grudgingly credited the Club for Old Prague members for successfully promoting the cubist architecture and its interpretation of the Prague's baroque genius loci (Harrington, 2020).

At the same time, facilitated by the enviable economic, industrial and technological developments, Prague became the centre of Avant-guard architectural experimentation, sparked by the construction of the Weissenhof residential complex in Stuttgart (1927), which opened the practical application of new ideas for contemporary urban housing design. Same year, the exhibition of the contemporary culture of living in Brno signaled the implementation of innovative structural organization and spatial distribution, which was implemented in a model individual housing Baba district in Prague, built between 1928-1932 (Janković, 2007: 38). These developments strongly informed the pioneering work of Sarajevo's early modernists on their home turf.

FORGING SARAJEVO MODERN(A)

Two of the first generation of Bosnian graduates from Prague School, architects Helen Baldasar and Dušan Smiljanić went on to design the Damić

House (1926) at No. 10 Radićeva ulica in Sarajevo, which is considered to be the first of a kind. Milošević (1997: 136; Odluka KONS, 2009b) asserted that this relatively modest urban infill "with façade articulated as a deep geometric relief and an underlying dynamism derived from the new sculptural ideas of cubism," was deeply infused with the ideas of the Prague School of architecture, as well as the evident influences of the Art Deco. However, it can be argued, that by proportion and vertical distribution of space, with an elongated two-storey bay-window over a recessed entrance, the architectural vocabulary of this building also pays homage to the traditional Bosnian house design (Fig. 6).

Figure 6. *Damić House, No. 10 Radićeva ulica, Sarajevo.*

The building has a characteristic functional detail around fenestration, designed as a pronounced continuous dripstone at lintel and windowsill levels, as can be seen at Smiljanić's Logavina School (1927) and Baldasar's Red Cross building (1929), which could be considered a signature detail of both architects.

Both Smiljanić and Baldasar taught at the High Technical School in Sarajevo and worked in private practice, since 1924, making a pioneering impact on the generations of younger architects in Bosnia which shaped the

modernist architectural practice. Smiljanić's design of the elegant residential block for the Waqif Jakub-Pasha, Obala Kulina Bana in Sarajevo, completed in 1935, was according to Milošević (1997: 152), inspired by Czech architect Ludvik Kysela's Bata Store in Prague (1929). The building façade features for the first time the continuous ribbon-windows, with glazed corner returns, with the recessed ground and top floor level, designed as an elongated glazed roof-light protruding from the pitched roof. The connection to the municipal gas supply was a technical novelty in housing design at the time (Fig. 7a).

Smiljanić designed several other multi-storey residential blocks in Sarajevo, applying the volumetric variations of the elongated multi-storey bay-window facade bulk as a recognizable design theme which harks back to the traditional house forms, but adapted to each specific location, as can be seen in the residential infill on the northern aspect of Mis Irbina ulica, adjacent to the crossroad with Augusta Cesarca ulica (Milošević, 1997: 137) (Fig. 7b).

a  b 

Figure 7a. *Waqif-Jakub-Pasha Apartments (1935), Obala Kulina Bana (Photo: Authors),* **7b**. *Residential infill (the 1930s), Mis Irbina ulica (Photo: authors).*

Most of the early modernist buildings in Bosnia date from a short period between 1926 and 1941, a time of a very complicated political situation caused by the autocratic centralism of the Kingdom of Yugoslavia (Majstorović, 1980: 21), marked by poor investment, practical neglect of

Sarajevo (Donia, 2006: 175) and loss of identity for Bosnia. However, the first issue of the first architectural magazine Arhitektura (1932) from Ljubljana showcased the completed projects from the main urban centres of Kingdom of Yugoslavia, included three newly completed buildings by Sarajevo's architects Helen Baldasar, Mate Baylon and Isidor Reiss, effectively showcasing, the arrival of new architecture trend to their city. The appraisals of this period in the early 1970 point to controversy provoked by the review "Architecture of Yugoslavia in XX Century" by Belgrade architect Mihajlo Mitrović for the Larousse Encyclopaedia (1971-1973; Cf. Milošević, 1991: 35) which described Sarajevo Modern period as a "veiled in Prague eclectic" (Mitrović 1971, cf. Baylon 1974: 257; Milošević 1997: 35; Harrington 2020: 125-126). This provoked a lengthy polemic ensued in the magazines Čovjek i Prostor (1974: 26-27) and Arhitektura i urbanizam (Belgrade), led by architects Mate Baylon (1974: 10-12; 1975), Branko Bunić (1971; 1974) and Dušan Smiljanić (1973), which merits a further examination outside of this paper.

One of the featured projects was the Red Cross building in Sarajevo (1929) (Arhitektura, 1932: 13; Odluka KONS, 2009a), designed by Baldasar with a brief for a mix-use public space comprising healthcare, administrative, social and cultural functions. The Red Cross Society of Bosnia and Herzegovina occupied the first floor, with the centrally located Cinema Hall which featured films with healthcare and educational content, whilst a public bath and a public kitchen were located in the basement (Fig. 8).

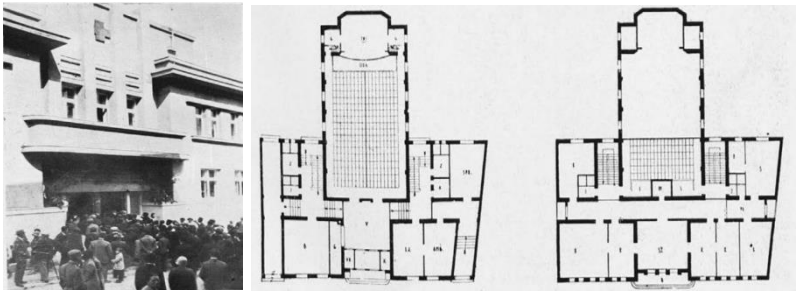


Figure 8. *The Red Cross building in Sarajevo, designed by Helen Baldasar, completed in 1929 (Arhitektura, 1931).*

The architecture of the building bears some elements of the modernist "steam–liner design," but Milošević (1997: 170) deems that it significantly encapsulates the formal concepts of the Czech Cubism, where the structural elements of the construction, particularly the central hall, provide a basis for the overall building modelling. It was severely damaged in the 1990s war and reconstructed between 2013-2017, after which the Red Cross Society of BiH returned to its historic headquarters (Fig. 9).

Figure 9. *The Red Cross building, Kranjčevića ulica, Sarajevo; After the full reconstruction (2013-2017).*

In contrast, the renovation of the historicist-style Hotel Zagreb building by Isidor Reiss in Sarajevo's Marijin Dvor district in 1932, shows the application of the radical modernism, in line with Teige's beliefs and Adolf Loos's slogan that "ornament is a crime," whereby the architect took to rid the existing façade of its original external decoration to make it modern (Fig. 10).

Figure 10. *(1) Original Hotel Zagreb building, corner Maršala Tita and Valtera Perića; (3,4) Photos made in 2007, 2019 (Photo: authors).*

According to the contemporary heritage preservation standards such an intervention might be considered a vandalism, but the building was listed as a National Monument (Odluka KONS, 2008c) precisely because of this unique embedded narrative of modernist radicalism.

Reiss worked in the office of Kamil Roškot in Prague between 1927-1929 after which he opened his practice and worked in Sarajevo until 1941 before he was taken to the concentration camp Jasenovac in 1941, where, tragically, he was killed in 1945 (Milošević 1997: 294-295). Among his numerous projects, Reiss designed the first high-rise building in BiH constructed in 1938 in Sarajevo's Marijin Dvor. Commissioned by the Railway Savings Union, this residential tower is built as a reinforced concrete structure and comprises the Basement with central heating and plant room, the Ground level with nine levels above, public and a service elevator, phone installation and fully fitted public shelter with electric lighting, sanitary facilities and other ancillary services (Fig. 11).

Figure 11. *The Railway Savings Union Residences (1938), corner Augusta Brauna and Dolina ulica, designed by Isidor Reiss (Photo: authors).*

At the same time, closer to the old historic core Baščaršija, on the left bank of Miljacka River, Reuf Kadić designed and oversaw the building of the mix-use residential block Waqf Čokadža Hadži Sulejman, in today's Austria Square in Sarajevo (Kadić, 2010: 6; Odluka KONS, 2011). The building completed the southerly aspect of a complicated cross-road delineated by structures from Austro-Hungary period and older Bosnian Ottoman residential micro-rayon in the background, which is no longer legible in the urban matrix. The values of Kadić's original design are the spacious light-filled apartments, and a structure which synthesises form and function that define the modern culture of living. While inspired by the Czech functionalism, its materialisation subtly paid homage to the older housing traditions (Fig. 12).

Figure 12. *Waqif Čokadža Hadži Sulejman, today the Austria Square in Sarajevo's Bistrik (Kadić, 2010).*

Belatedly appraised as an original contribution to European modernism of its time (Ibelings, 2011) based on the quality of design, fit-out and technical innovations, the local appraisal goes further to highlight its functionalist character and form which emerged from its structural skeleton, as a clear departure from the hybrid styles of the past (Finci, 1963: 42). However, these architectural qualities are all but obscured at present time, due to deterioration of built fabric, inadequate repairs and interventions, and overall lack of maintenance.

Two other high-quality residential projects for the Waqif Hovadža Kemaludin (Mekteb) (1940) and the Pension Fund Residences (1940) in Sarajevo, by Reuf Kadić and Muhamed Kadić show a particular attention to the internal spatial organization of the apartment units managing to maximise the location and daylight aspects.

The first one, Mekteb (Fig. 13), built on a tight location at the corner of Ferhadija and Ćemaluša ulica, provides generous apartment layouts and, at the time, novel utilities such as the telephone line and the Municipal gas supply, which powered the built-in cooker in the kitchen and the hot-water

storage in the bathroom (Kadić, 2010: 86-88; Odluka KONS, 2012; Harrington 2020: 137-138).

Figure 13. *Waqf Hovadža Kemaludin (Mekteb) (1940) (Photo: Authors).*

The second, the Pension Fund Residences (Fig. 14), an elegantly sculpted corner block facing both Hamza Humo and Titova ulica (Štraus, 2006: 3; Janković, 2007; Kadić, 2010) was designed as a mix-use development. Its semi-cylindrical corner bulk overhangs the recessed glazed commercial ground floor level forming a terrace for the three upper levels, to accentuate the functional change from public to private use (Odluka KONS, 2008d; Harrington, 2020: 138-139). The Residences, with several types of units, were originally designed for retired couples who wished to downsize. They benefit from the east-west orientation and daylight which deeply penetrates into the functionally connected circular flow of rooms whose internal glazed partitioning and openings allow for flexible use and adaptability.

Figure 14. *The Pension Fund Residences (1941-42), architects Reuf and Muhamed Kadić (Photo: Authors).*

Another smaller-scale project for a single-family dwelling, Kopčić House (1939) in Savfet Beg Bašagić ulica, deserves mention here as an example of the successful integration of modern structure within an older residential district Kovači in Sarajevo (Kadić, 2010: 60; Janković 2007: 51-52; Harrington, 2020: 139) skilfully referencing the volumetric characteristics of the Bosnian Ottoman house. Its composition and materialisation are inspired by the Bosnian vernacular house, which is skilfully interpreted through the modernist vocabulary. This is legible in the separation of the ground and first floor levels and the barely visible structural pillars which creates a hovering effect and in ribbon fenestration and geometric recesses which create shadow and playfully contrast the white walls, balcony and windows (Fig. 15). Unlike many other buildings designed by Reuf and Muhamed Kadić (Štraus, 2006: 3) this individual dwelling is well maintained and preserves its original features.

The creative collaboration between two brothers Kadić and the outputs of their emerging practice were disrupted by the World War 2. They both continued working on various tasks assigned to them during the post-war reconstruction of Sarajevo's infrastructure and on many industrial and housing complexes in Bosnia and Herzegovina. Most notably, the residential scheme Džidžikovac (1946) built in Sarajevo's central hillside

area shows the continuity of the authors' functionalist approach in design and apartment layouts, characteristic also by the resourceful engineering solutions for non-weather-dependent construction (Odluka KONS, 2008a; Harrington, 2020: 142-143).

Figure 15. *Kopčić Family House (1940), Sarajevo (Photo:aAuthors).*

The scope and impact of their work, in the interwar period and beyond, was at the heart of progressive modernising architectural trends are still understudied. Their urban interventions and architecture, including post-war projects, demonstrate the vitality of the finest principles of early Modernism adapted to the local context, thus representing the continuity of search for the expression of identity and place-making in the Bosnian context (Harrington, 2020: 144).

CONCLUSION

The Commission: The task of protecting older architectural heritage while at the same time enabling a balanced and sustainable new developments in Sarajevo and other parts of Bosnia is enormous , despite progress made in the thirty years after the 1990s war. The Commission to Preserve National

Monuments has compiled a significant inventory of protected structures and sites with some success in generating external funding and support for rehabilitation of specific structures. Its worthy efforts on systemising the existing information from literature and archives need to be matched with professional methods and accuracy of surveying and recording the architectural heritage; and proactive in engagement with urban development plans in each respective local authority. It is unclear how the general digitalisation trends are enabling the collaboration and information update, and what are the plans to consolidate the records and make them more publicly accessible. There are many interested and engaged professionals within academia and civil society, whose campaigns and targeted actions have prompted or helped the Commission to complete its remit, as for example the action for the inclusion of the Crni Vrh urban settlement on the list of national monuments. The question remains, how will the monuments be protected in reality and what time and resources will that require; and, what other necessary platforms need to be established for better knowledge exchange and management.

Heritage and planning: The Commission's work, and the work of other responsible institutions at entity, cantonal and municipal levels would be more effective if there is a longer term clear structure and coordination of responsibilities and resources. That work is hindered by systemic gaps and disconnects from the planning and development programmes and overall lack of strategic planning, without which it is difficult to adequately prioritise and resource. It would be beneficial to better channel and utilise the good will of donors, professionals and civic society, by creating knowledge exchange platforms to inform future programs and actions.

Contextual modernism and the building control: The review of historic buildings and evolution of their designs shows a fragile but persistent tendencies to maintain and express the values, scale, elements and forms of the local heritage, which includes not only vernacular, but also public,

commercial and industrial architecture. What is the relevance of connecting the narratives of the Bosnian Style/Bosanski slog and the early Modern(a) in focus here? Firstly, because it tracks the appearance of respectful attitudes to heritage in encounter with the new-built and new construction technology, similar to today's challenges in many places in Europe, where the urge to build has to be balanced with the existence of many historic structures and ensambles. In other words, there has to be less (or more controlled) new building and less demolition, and the new has to be integrated with the old, in a sustainable way. Secondly, the historic review referencing the original field surveys, study trips and projects inspired by the Bosnian vernacular, shows the evolution of thought and intellectual maturing of the profession, which is applicable in any location and is particularly relevant when the pressure of large-scale investment threatens to over-rule the considerations for basic quality principles, generated by the architectural modernism. The phenomenon of the Bosnian Style represents also a missing link for the later generations of regional architects who aspired to affirm the proto-modern qualities of the Bosnian Ottoman architecture and urban forms thus destabilising the East-West modernist divide. The ambition, concepts and architectural quality of the number of interwar spatial concepts match the concurrent trends and achievements of the early Modern movement in the rest of Europe.

Forms of engagement: A solid and well-documented inventory in making, located in the Commission to Preserve National Monuments provides a baseline reference which needs to be supported and exported to the maps and local area plans, as a body of accomplished study and a resource which will be a holistic pretext and background for future developments. To achieve such goal, there has to be a role and place of professions and civic society to supplement the resource and to fill the consensus-making gaps between the institutions, which can be facilitated by the digital and information technology, within a well-defined procedural platform.

Reminiscent of the professional activism of the past, some recent examples, such as the inclusion of the urban ensamble Crni Vrh on the list of national monuments, upon successful campaign mounted by the civic society and profession, shows the way. The Commission's work could be enhanced by the stronger links with academia, which in turn would inform the direction and evolution of research within architectural education in five schools of architecture in the country, enriching the Commission's outreach not only to external donors but also with the domestic external expertise.

REFERENCES

Arhitektura, (1932). *Arhitektura: Mesečna revija za stavbno-likovno in uporabno umetnost.* Ljubljana: Konzorcij Arhitekture (Dragotin Fatur), https://www.dlib.si/details/URN:NBN:SI:doc-QZQ4BTC0?&language=eng

Arnautović, S. (1984). Mogućnost primjene nekih elemenata bosanskohercegovačke tradicije na savremene industrijske enterijere stanova. [Master Dissertation, University of Sarajevo]. Sarajevo: University of Sarajevo.

Bakrač, J. (1979). *Sto godina vatrogastva BiH, 1879-1979*, Travnik: Borac.

Baylon, M. (1974). Osvrt na pisanje o arhitekturi XX vijeka u Jugoslaviji. *Čovjek i Prostor*, 257, 10-12.

Baylon, M. (1975). Dokumentacija uz jedan prikaz. *Arhitektura i Urbanizam*, 73.

Božić, J. (1989). Arhitekt Josip pl. Vancaš, Značaj i doprinos arhitekturi Sarajeva u periodu austrougarske uprave. [Doctoral Dissertation, University of Sarajevo]. Sarajevo: University of Sarajevo.

Bunić, B. (1971). Pojava moderne arhitekture u Sarajevu. *Čovjek i Prostor*, 11.

Bunić, B. (1974). Dezinformacija u Enciklopediji Larousse. *Čovjek i Prostor*, 250.

Dimitrijević, B. (1991). Arhitekt Karlo Paržik. [Doctoral Dissertation, University of Zagreb]. Zagreb: University of Zagreb.

Donia, R. J. (2006). *Sarajevo: A Biography*. Ann Arbor: University of Michigan Press.

Donia, R. J. (2007). The Proximate colony Bosnia-Herzegovina under Austro-Hungarian Rule, *Kakanien Revisited*, 9, 1-7. https://www.cidom.org/wp-content/uploads/2018/04/Robert-Donia-The-Proximate-colony-Bosnia-Herzegovina-under-Austro-Hungarian-rule.pdf

Feichtinger, J. & Heiss, J. (2013). Distant Neighbors: Uses of orientalism in the late nineteenth-century Austro-Hungarian Empire. In J. Hodkinson, J. Walker S. Mazumdar & J. Feichtinger (Eds.) *Deploying Orientalism and Culture and History: From Germany to Central and Eastern Europe*, New York: Boydell and Brewer Inc.

Finci, J. (1963). *Razvoj dispozicije i funkcije u stambenoj kulturi Sarajeva.* Sarajevo: Zavod za stambenu izgradnju SR BiH.

Gillespie, P. (2020). "Trump pins hopes on racism and China." World View. The Irish Times, 1 August

Government of Ireland. (2009, October 5). National Inventory of Architectural Heritage. https://www.buildingsofireland.ie/

Habermas J, & Ben-Habib, S. (1981). Modernity versus Postmodernity. *New German Critique,* 22 (Specialist Issue on Modernism) Winter 1981: 3-14.

Harrington, S. (2020). OTHER MODERNISM: Underpinning the Case of the History Museum of Bosnia and Herzegovina. [Doctoral Dissertation, University of Strathclyde]. Glasgow: University of Strathclyde.

Harrington, S., Dimitrijević, B. & Salama, A.M. (2019). Synchrony-city: Sarajevo in five acts and few intervals, *Archnet-IJAR*, 13 (3), 573-594. DOI: 10.1108/ARCH-05-2019-0125

Hartmuth, M. (2015). K. (u.)k. colonial? Contextualising Architecture and Urbanism in Bosnia-Herzegovina, 1878-1918. In C. Ruthner, D.R. Cordileone, U.R. & Detrez, R. (Eds.), *WechselWirkungen: Austria-Hungary, Bosnia-Herzegovina, and the Western Balkans, 1878-1918* (pp. 155-184). New York: Peter Lang Publishing.

Hartmuth, M. (2018). Amtssprache Maurisch? Zum Problem der interpretation des

Orientalisierenden Baustils im Habsburgischen Bosnien-Herzegowina. In C. Ruthner & T.Scheer (Eds.), *Bosnien-Herzegowina und Osterreich-Ungarn, 1878-1918. Annaherungen an eine Kolonie*, (pp. 251-266). Tübingen: Narr Francke Attempto Verlag GmbH + Co. KG

Historic England (1998). The Royal Pavilion Brighton, https://historicengland.org.uk/listing/the-list/list-entry/1000205 (accessed 27.08.2020)

Hrasnica, M. (2003). *Arhitekt Josip Pospišil: Život i djelo*. Sarajevo: Arhitektonski fakultet Sarajevo

Husedžinović, S. (2020). *Graditeljstvo Bosne i Hercegovine kroz stoljeća*. Sarajevo: Dobra knjiga

Ibelings, H. (2011). *European Architecture since 1890*. Amsterdam: SUN architecture.nl

Imamović, M. (2013). *Knjiga pamćenja*. Sarajevo: University Press Izdanja Magistrat

Janković, Ž. (2007). *Muhamed Kadić – život i djelo*. Sarajevo: Akademija nauka i umjetnosti Bosne i Hercegovine, Bošnjački institut Fondacija Adila Zulfikarpašića

Kadić, E. (2010). Arhitekt Reuf Kadić i počeci moderne arhitekture u Bosni i Hercegovini. Sarajevo

Kebeljić, S. (1991). Srednja tehnička škola. *ARH. Časopis za arhitekturu, urbanizam i oblikovanje*, 23, 101-108

Kraljačić, T. (1987). *Kalajev režim u Bosni i Hercegovini 1882-1903*. Sarajevo: Biblioteka Kulturno naslijeđe

Kruševac, T. (1960). *Sarajevo pod Austro-Ugarskom upravom 1878-1918*. Sarajevo: Muzej grada Sarajeva

Krzović, I. (1987). *Arhitektura Bosne i Hercegovine 1878-1918*. Sarajevo: Umjetnička galerija BiH

Krzović, I. (2004). *Arhitektura secesije u Bosni i Hercegovini*. Sarajevo: Sarajevo publishing

Kurto, N. (1997). *Sarajevo 1492-1992*. Sarajevo: Oko

Kurto, N. (1998.) *Arhitektura Bosne i Hercegovine, Razvoj bosanskog stila*, Sarajevo: Sarajevo Publishing

Majstorović, S. (1980). Cultural policy in Yugoslavia: self-management and culture (Book), UNESDOC Digital Library. https://unesdoc.unesco.org/aek:/48223/pf0000134196 (accessed 6 September 2019)

Milošević, P. (1997). *Arhitektura u kraljevini Jugoslaviji (Sarajevo 1918-1941).* Foča: „Prosvjeta"

Mitrović, M. (1971-73). *Arhitektura Jugoslavije u XX veku*. In: Opšta enciklopedija Larousse (pp. 887-888), Beograd: Vuk Karadžić.

Odluka KONS (2007). The decision of the Commission for the Preservation of National Monuments on the proclamation of the building of The National Waqf (Rijaset of the IC in BiH and Waqif Directorate) and Hadim Ali-paša Waqif in Sarajevo as the national monument, at the meeting, held on September 11 to 18, 2007, in Sarajevo

Odluka KONS (2008a). The decision of the Commission for the Preservation of National Monuments on the proclamation of the Hotel Stari Grad (Old Han of Gazi Husrev-Bey, the Hotel Gazi) and residential building Kadić (designed by Josip Vancaš) in Sarajevo as the national monument, at the meeting held on January 28 to February 5, 2008, in Sarajevo

Odluka KONS (2008b). The decision of the Commission for the Preservation of National Monuments on the proclamation of the Architectural unit–the Residential area at Džidžikovac in Sarajevo as the national monument, at the meeting held on January 29 to February 5, 2008, in Sarajevo

Odluka KONS (2008c). The decision of the Commission for the Preservation of National Monuments on the proclamation of the Hotel Zagreb in Sarajevo as the national monument, at the meeting, held on March 11, 2008, in Sarajevo

Odluka KONS (2008d). "Odluka o proglašenju nacionalnog spomenika Historijska građevina-Zgrada Penzionog Fonda (zgrada na uglu ulica Maršala Tita i Hamze Hume) u Sarajevu." Sarajevo: Komisija za očuvanje nacionalnih spomenika, 27 May to 2, June 2008, in Sarajevo

Odluka KONS (2008e). The decision of the Commission for the Preservation of National Monuments on the proclamation of the Fire Brigade Barracks in Sarajevo as the national monument, at the meeting, held on July 15 to 17, 2008, in Sarajevo

Odluka KONS (2009a). The decision of the Commission for the Preservation of National Monuments on the proclamation of the historical building of the Red Cross in Sarajevo as the national monument, at the meeting, held on March 10 to 16, 2009, in Sarajevo

Odluka KONS (2009b). The decision of the Commission for the Preservation of National Monuments on the proclamation of the House Damić in the Radićeva street no. 10 in Sarajevo as the national monument, at the meeting held on May 12 to 18, 2009, in Sarajevo

Odluka KONS (2011). The decision of the Commission for the Preservation of National Monuments on the proclamation of historical building Residential and commercial property of the Čokadži Sulejman Waqf in Sarajevo as the national monument, at the meeting held on November 21 to 24, 2011, in Sarajevo

Odluka KONS (2012). "Odluka o proglašenju nacionalnog spomenika Historijska građevina-Stambeno-poslovni objekat Vakufa Hovadža Kemaludina (Mekteb) u Sarajevu." Sarajevo: Komisija za očuvanje nacionalnih spomenika, 26 to 28 March 2012, in Sarajevo

Pašić, A. (2015). *Arhitektura Bosne i Hercegovine. Austro-Ugarski period 1978-1918*. https://www.cidom.org/wp-content/uploads/2015/12/Amir-Pa%C5%A1i%C4%87-Arhitektura-BH-1878-1918_opt.pdf (accessed 27 August 2020)

Powell J. & S. Menendian. (2016). The Problem of Othering: Towards Inclusiveness and Belonging. http://www.otheringandbelonging.org/wpcontent/uploads/2016/07/OtheringAndBelonging_Issue1.pdf (accessed 27 August 2020)

Ruthner, C. (2018). Habsburgs only colony? Bosnia-Herzegovina and Austria-Hungary, 1878-1918, *SEEU Review*, 13 (1), 2-14. DOI: 10.2478/seeur-2018-0002

Smiljanić, D. (1973). "Jedan površan prikaz arhitekture XX vijeka u Jugoslaviji." ARH. Časopis Društva arhitekata Sarajeva, No. 19-20
Smith, L. Uses of Heritage. Burwood, Vic.: Cultural Heritage Centre for Asia and Pacific, Deakin University, 2006.

Stix, E. (1887). *DAS BAUWESEN IN BOSNIEN UND DER HERZEGOWINA vom Beginn der Occupation durch die Osterr.ung. Monarchie*. Wien: aus der kaiserlich-königliken Hof und Staatsdruckerei

Štraus, I. (2006). Muhamed Kadić, 100 godina rođenja. Potpuni nemar i ravnodušnost. http://www.a4a.info/ArticleViewasp?article_id=949 (accessed 16 November 2014)

U.S. Department of State. Annex 8. Dayton, 21 November 1995. https://2009-2017.state.gov/p/eur/rls/or/dayton/52593.htm (accessed 05.10.22)

Vancaš, J. "Bosansko narodno graditeljstvo," Tehnički list, No. 24, X, Zagreb, 31.12 1928

Waterton, E. (2010). *Politics, Policy and the Discourses of Heritage in Britain*. Basingstoke: Palgrave Macmillan.

Winter, T. & E. Waterton. (2013). Critical Heritage Studies. *International Journal of Heritage Studies*, 19 (6), 529-531. DOI: 10.1080/13527258.2013.818572

Winter, T. (2013). Clarifying the critical in critical heritage studies. *International Journal of Heritage Studies*, 19 (6), 529-531. DOI: 10.1080/13527258.2012.720997

URL-1. Komisija za očuvanje nacionalnih spomenika, http://old.kons.gov.ba/main.php?id_struct=40&lang=1, accessed 05.10.22

URL-2. National Inventory of Architectural Heritage (NIAH) is an initiative of the Government of Ireland as part of its commitment to Granada Convention signed in 1985. It was legislated in 1999 as part of the Planning and Development Act 2000, with over 65000 digitalised records for buildings and gardens. https://www.buildingsofireland.ie/, accessed 05.10.22

Journal of Architecture, Arts and Heritage (JAH) – Vol. 1, Issue 2, November 2022
e-ISSN: 2822-437X

Cuban heritage: the architecture of the revolution. The importance of awareness

Niccolò Pozzi[1]
Politecnico di Torino, Department of Architecture and Design
niccolopzz@gmail.com
ORCID No: 0000-0002-4931-6642

Matteo Barisone[2]
Politecnico di Torino, Department of Architecture and Design
mattebarisone@gmail.com
ORCID No: 0000-0003-2174-1660

Submission Date: 10.11.2022 / Acceptance Date: 13.11.2022

ABSTRACT

The Cuban Socialist Revolution - one of the most important pages of contemporary Latin American history - deeply changed the internal relationships of the country's political, social and cultural structure. With its anthropocentric influence, architecture suffered the most from these changes given its close connection with society and economy. From its earliest moves, the Revolutionary Government initiated a vast plan of "Welfare Architecture" intended to change the irrational and immoral social divide traced by the dictatorship and the bourgeoisie.

The pressing need to build houses, schools, factories and hospitals quickly and at minimal cost led to the increasing use of prefabricated elements with their consequent uniformity, monotony and aesthetic mediocrity. New urban and suburban areas emerged as the result, putting at risk the beauty of the natural environment and cities, threatening to turn their inhabitants into cogs in an unstoppable housing and production machine, but conceiving in some cases works of profound architectural value (Portuondo, 1966).

KEYWORDS

Cuba, Cuban architecture, conservation, heritage, Plaza de la Revolución.

REPORT FROM HAVANA

The title of the essay, "Report from Havana", refers to an article by Sergio Baroni, published in October 1992 (Fig. 1) in the eighth issue of the new series of the magazine "Zodiac" edited by Guido Canella who, from 1989 to 2000, gave to the architecture semi-annual magazine, founded by Adriano Olivetti in 1957, an international character among the most important projects of contemporary architecture (Baroni, 1992).

In the editorial, Cannella dictates the outlines of a possible “Latin American Laboratory” which will later become one of the central themes of his research:

«... and since cities seem to grow better out of crises, one wonders whether Latin America has not now become a laboratory that will eventually revitalize the West’s own architecture also.» (Canella, 1992: 12- 14).

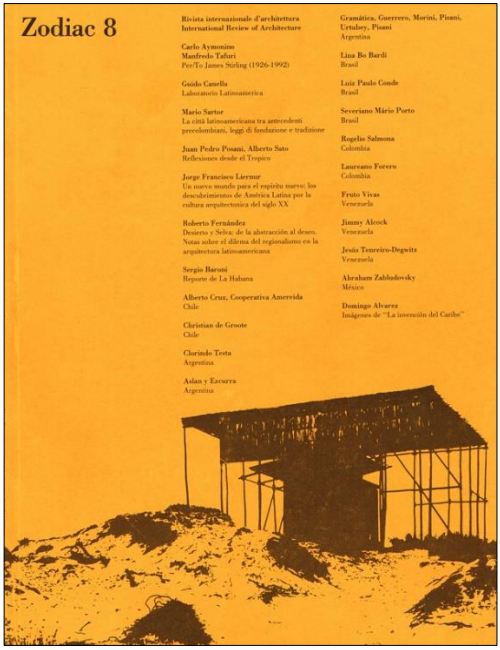


Figure 1. *Cover of issue 8 of 'Zodiac', October 1992 dedicated to Laboratorio Latinoamerica (ZODIAC, 1992; 8).*

> «This is precisely the sense of this 'report'; it does not aim at providing a comprehensive overview of the current architecture in Cuba, but rather some considerations on particular aspects that may demonstrate its evolutions.» (Baroni, 1992: 171).

Culturally and economically excluded from the North American blockade, Cuba had to undertake, from the first years after the victory of the revolutionary front, alternative paths of development. This led to the experimentation of new forms and building techniques, creating a singular identity relationship with the context.

«In the end, Cuba did nothing more than behaving like other First World countries, with the same wars, colonization and revolutions that filled them with pride but in a different era.» (Cuadra, 2019: 18).

The aspiration was to promote national welfare by adopting reforms aimed at reaching an equitable distribution of income. This would have allowed the country to realize one of the dreams that guided the revolution: achieving equality among social classes. To do so, the State rolled out programs designed to guarantee effective access to basic services (education, health, work and housing) and ensure social equality for all Cuban citizens. Among these programs, the "literacy campaign" promoted in 1959 by the revolutionary government to respond to the high illiteracy rate in the country has been one of the most important and successful ones. At the time, illiteracy was particularly widespread among the elderly and the Campesinos living in the countryside. Through the campaign, the young revolutionaries promoted a capillary diffusion of education within the Cuban territory (Fig. 2).

Figure 2. *Cuban literacy campaign, 1961 (Granma 22.12.2016).*

It was necessary the construction of hundreds of internal secondary schools, that become the “centres" of the new Cuba” (for pupils aged between 12-16 years who divided their time between study and work, carrying out all the activities of associated life within the school), to give life to one of the most audacious cultural operation of the Cuban Revolution (Salinas, 1971).

Therefore, architecture played a primary role in this period of major reforms. Education, health, work and housing, in addition to their cultural and educational value, require typological and settlement planning and suitable structures (Coyula, 2002).

After 1959, architecture became a revolution itself: the means by which to achieve the country's new goals, namely to guarantee a dignified life for all citizens and, step by step, to revive the fortunes of the nation after the years of dictatorship and American control. The new government adopted the slogan "Revolucion es construir" (Fig. 3), in a period, the initial one, that represents one of the most politically and culturally intense moments of the Cuban Revolution (Cuadra, 2019).

> «Revolución ES CONSTRUIR. The slogan means that Revolution is about doing, and changing by doing; good intentions are not enough, and it is not enough to talk, discuss or propose, everything must be accompanied by actions.» (Cuadra, 2019: 46).

Figure 3. *Revolucion es construir (Cuadra, 2019).*

Sergio Baroni analyzed this first phase of the revolution with particular attention, sensing the birth of an experimental laboratory of Cuban architecture. He recognized the Escuela Nacional de Arte (ENA), 1961-1963, and the Ciudad Universitaria José Antonio Echeverría (CUJAE) 1960-1964, both built in Havana, as foundational to this process (Baroni, 1992).

«Two contemporary projects that chose opposite typological and linguistic solutions, revealing themselves emblematic and premonitory in this.» (Baroni, 1992: 163).

As early as 1960, Fidel Castro and Ernesto Guevara identified the area previously occupied by the American bourgeoisie's Country Club as the ideal and symbolic place to build the National Art Schools (ENA), a new cultural hub for the new Cuba. A 'Three Worlds" school centre, with five schools of modern dance, ballet, music, plastic arts, and dramatic arts, intended for students from Africa, Asia and Latin America.

The project was entrusted to the Cuban architect Ricardo Porro and two Italian architects, Vittorio Garatti (Fig. 4) and Roberto Gottardi, and it initially envisaged a single architectural body. Later, as the design phases progressed, they decided on five independent schools. This choice allowed the creation of a place of architectural and artistic continuity, integrated into the landscape, that could be a source of inspiration for students and teachers.

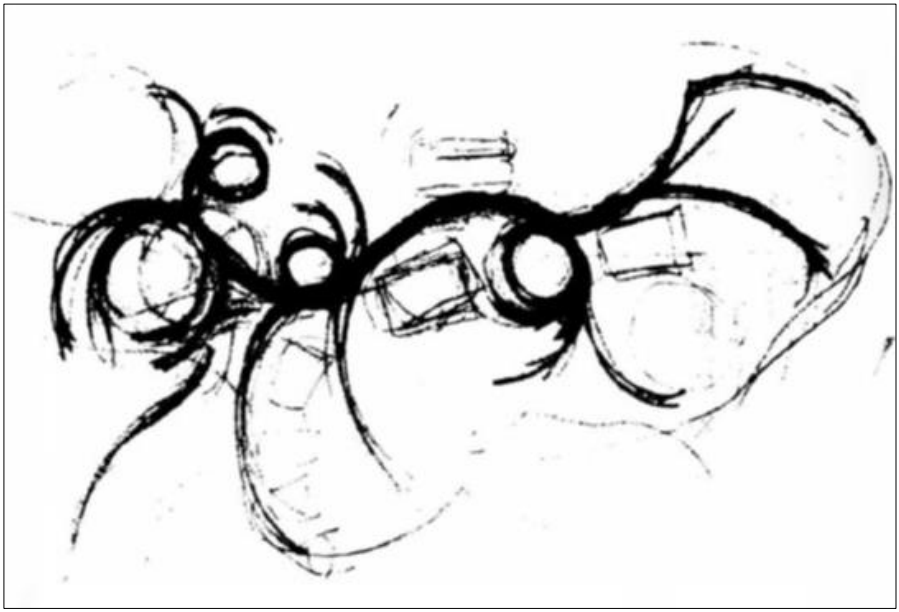


Figure 4. *Garatti, V. Drawing by Studio Ballet School, Avana, 1961 – 1963 (Alini, 2020).*

Porro, Garatti and Gottardi succeeded in conceiving a unique and unrepeatable complex, designed to fit exactly the surrounding environment with its various slopes, elevation changes and obstacles posed by nature. They created an architecture that could be used in full, without any distinction between interior and exterior and between structure and paths (Fig. 6) (Semerani, 2001).

At the opposite end of the spectrum, the CUJAE (Fig. 5), home to the Istituto Politecnico Superiore de Tecnológia de La Habana, represents an architectural counterpoint to the artistic-cultural path of the Art School. The first, a prefabricated university town located close to the capital's production centre, the second, an organic architecture set in the green of the ENAs.

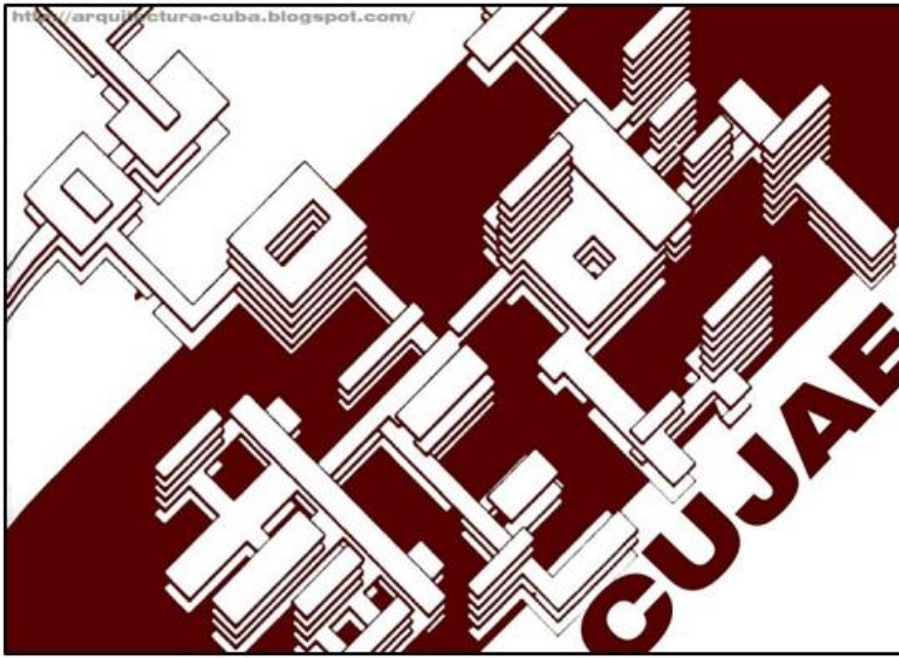


Figure 5. *Alonso, H. Azze, E. Fernandez, J. Ciudad Universitaria J. A. Echeverrìa, Havana 1960 – 1964 (Lapidus, 1966).*

The fundamental principle of the CUJAE project is base on the industrialization process through the use the newest and best-performing construction materials and techniques, and the rejection of traditional Cuban construction methods. The "lift slab system" (Lapidus, 1966) was adopted. This technique is based on the use of reinforced formwork placed on the ground where concrete was poured, and then lifted and fixed to the previously erected pillars. The result reflects a substantially orthogonal geometry, leading to the rational use of space and light (Fig. 7).

Figure 6. *Garatti, V. Ballet School, Havana, 1961 – 1963 (Alini, 2020).*

Figure 7. *CUJAE University, Faculty of Architecture, Havana 1960 – 1964 (Barisone & Pozzi, 2021).*

The reduction of structural elements determines the uniformity of the complex, but above all, the designers' search for a functional solution that implies a dynamic spatial variation. A variation that envisages an alternation of structure, architectural volumes, open and closed spaces, and differences in height as a characterizing factor. An architectural and spatial coherence is maintained by the constant presence of the open plan, favoring the flow of people in the buildings. This choice implies not only the possibility of adopting useful solutions to satisfy functional requirements but also allows future expansions without distorting, the existing constructions from a technical and aesthetic perspective. The idea is that the form should not be conceived as an aesthetic crystallisation but as a continuous becoming. A direct relationship is manifested between architecture and volumes, with their necessary functional interior and exterior spaces. Spaces that recognize the importance of the urban context, of the landscape, of architecture and engineering - whose close relationship allow to express their creativity in full. The spaces are rich in the rationality described at the beginning. The

coldness of technology and industrialization is balanced by the warmth and sharing of the university life.

«They characterize the advent of a new type of university student: optimistic, stoic, closely linked to production and human issues, and to life: the future communist technician.» (Lapidus, 1966: 14 - 15).

> «If the question is: What is the Revolution? The answer is the "Revolution is architecture", the Revolution is designing by integrating rationality with poetry, exalting technique, and elevating the relationship between man and nature within society.» (Cuadra, 2019: 72).

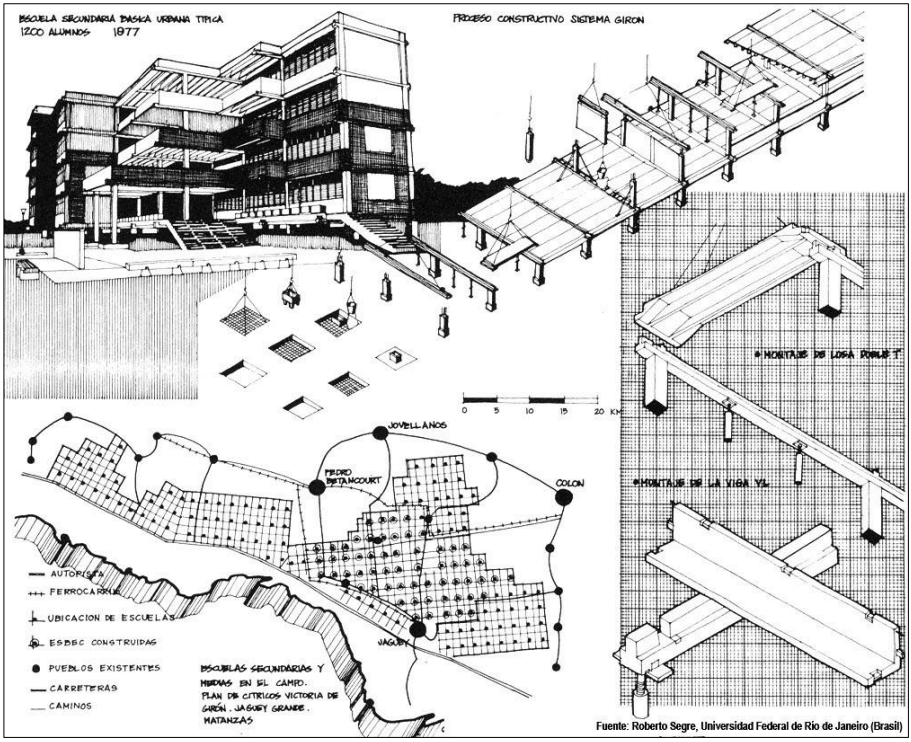


Figure 8. *Graphical representation of the school construction (Lapidus, 1966).*

It is therefore evident that the architectural technique represented by the CUJAE possesses great intrinsic values. It can adapt to countless different spatial contexts, it allows the use of fewer and more economic resources, and lastly, it permits a rapid construction.

«The Art Schools (ENA) follow one path while the CUJAE follows another, but both aim at the same goal, they are profoundly architectural.» (Lapidus, 1966: 14 - 15).

The difference between these two realities immediately placed the experimental laboratory identified by Baroni at a crossroads. On one hand, the country was in urgent need of structures that could meet all the requirements dictated by the development programmes and reforms. On the other hand, the amount of time was limited and so was the capital available for investment. Inevitably and understandably, this pushed towards the industrialization of architecture. Prefabricated construction methods (Fig. 9 & Fig. 10) were identified as the best technical option to be applied throughout the country. Technicians, architects and craftsmen moved towards new forms giving rise to a new urban landscape over the years.

> «The imperative need to build houses, factories, schools, hospitals, etc. in a short period and at a minimum cost led to the increasing use of prefabricated elements, with the consequent uniformity, monotony and aesthetic mediocrity.» (Portuondo, 1966: 5 - 6).

« [...] To cope with the huge demand for projects and construction with minimum resources. [...] In the construction sector, modernization took the form of industrialization, typification and prefabrication.» (Garrudo, 1978: 42).

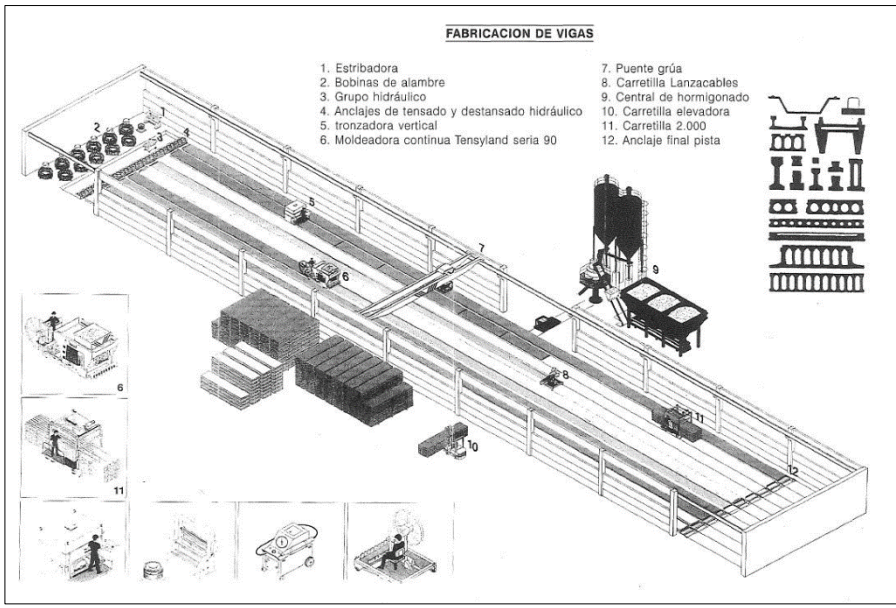


Figure 9. *Axonometry of the beam moulding machine planned for the Giron system (Cuadra, 2019).*

INVESTIGATION INTO CUBAN ARCHITECTURE 1960-1990

Based on these considerations, during our research period in Havana, we decided to identify and catalogue (Fig. 10) a substantial number of emblematic architectures (in the urban context of the city) from the revolution period under examination (1960s-1990s).

Thanks to the support of Prof. Sergio Rayman Iglesia - professor at the Colegio Universitario San Gerónimo de La Habana - and the participation of architects and engineers active in the local national territory, it was possible to identify the buildings that best represented the state interventions implemented during the Revolution (Barisone & Pozzi, 2021).

The survey aimed at creating a sort of identity document for each of the architectures identified and mapped. For each building, information has

been provided on the author, the date of construction, the construction method, the primary function and any changes of use that may have occurred over time, and the current state of conservation. In addition, a short critical text focusing on the typological and compositional aspects was produced to allow a better understanding of the buildings censed. The census, in addition to being a valuable tool for increasing knowledge about modern architecture in Latin America, highlighted the widespread state of abandonment of buildings and the contestual lack of valorization projects.

Noting the current state of degradation, we deepened into the evolution of the Cuban legislative framework related issues of conservation, valorization and maintenance of cultural heritage.

In 1963, the Cuban Revolutionary Government enacted Law No. 1117 which instructed the Consejo Nacional de Cultura to take charge of restoration and recovery initiatives of colonial architecture throughout the country (Fig. 11). This did not lead to the desired developments and resulted in few and isolated interventions.

During these years, both institutions and people lacked awareness on the importance of preventive action to protect and invest in the conservation of the architectural heritage (Fig. 12).

The 1970s represented a fundamental decade with regard to the subject of valorisation in Latin American countries like the enactment from UNESCO of the Ley Federal sobe Monumentos y zonas arqueologicos, artisticos e historicos (Ley Federal Sobre Monumentos Y Zonas Arqueologicos, Artisticos E Historicos, 1972).

Figure 10. *Barisone, M. Pozzi, N. Census extract (Barisone & Pozzi, 2021).*

Cuba kept pace with this innovative current introducing a series of laws and regulations on the protection, valorisation and conservation of the Cuban heritage. This process coincided with the new socialist Constitution in 1976 and the promulgation of two important executive laws by the Asemblea Nacional del Poder Popular in 1977:

- Law No. 1: Protección al Patrimonio Cultural.
- Law No. 2: Declaración de Monumentos Nacionales y Locales.
(Gaceta Ofical Republica De Cuba, 6 Agosto 1977).

In 1979, the Executive Committee of the Council of Ministers issued Decree No. 55 concerning the implementation of Law No. 2, (Decreto 55: Reglamento Para La Ejecución De La Ley 2 De Los Monumentos Nacionales Y Locales, 29 Novembre 1979) The Decree legally established the concepts, principles and regulations that determined the process for the conservation of the architectural and urban heritage. Further, it introduced the so-called degrees of protection of assets entered in the Register of National and Local Monuments. The implementation of these laws and decrees led to the creation of new institutions, such as the Consejo Nacional de Patrimonio Cultural (CNPC), which regulates the national register and governs the training of restoration and conservation technicians; and the Oficina del Historiador which, directed by Eusebio Leal Spengler since the 1980s, restored the heritage of La Habana Vieja with dizzying dynamism. This created a connection between Cuba and the rest of the world attracting funding and tourism. and the rest of the world, in order to attract funding and tourism.

The historic centre of the city of Havana is the result of centuries of layering of architectural heritage, with visible signs of decline and deterioration associated with the city's growth.

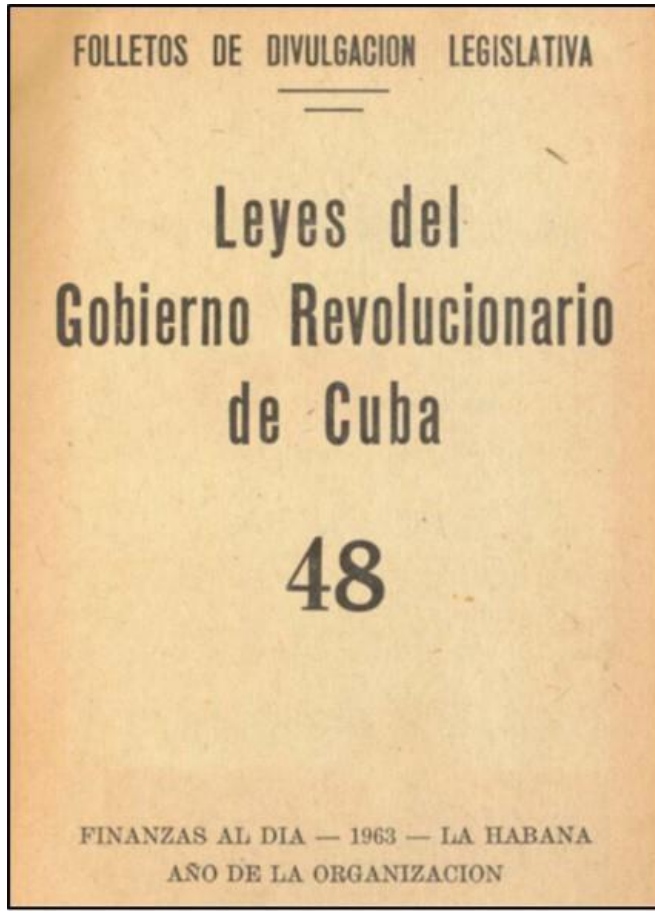


Figure 11. *Leyes del Gobierno Revolucionario de Cuba, No 48, 18 July 1963 (URL-1).*

Eusebio Leal Spengler recognized that the displacement – in the 20th century - of the richest segments of the population from the historic centre of the capital to new and more comfortable areas led, over time, to the formation of a city fabric with a very high density of low-income population. The Oficina del Historiador succeeded in reorganizing the strategic planning process and integrated it into its broader urban version - including the

restoration of buildings and urban spaces and the management of economic resource (Niglio, 2015).

The financial resources favourable to this development were provided by hotel companies, international cooperation, real estate investments, donations and bank loans that allowed for the immediate investment in social programmes and projects that generated wealth and contributions to the heritage restoration programme (Zardoya, 2019).

The fundamental goal of the Oficina del Historiador is outlined by a quote from Eusebio Leal:

> «The art of restoration lies in being able to respect the passing of time, to respect the succession of its stages that may have retained traces of value, in which the identity and personality of buildings and houses are nested.» (Spengler, 2011).

In 1982, Eusebio Leal saw his efforts recognized with the UNESCO declaration of the fortified city of La Habana Vieja as a World Heritage Site. In the same period, following this cultural development, a growing interest in twentieth-century architecture emerged within the country. New courses of study were founded in the faculties of Architecture, and significant texts on modern Cuban architecture were published (Rodriguez, 2012).

- 'La Habana. Apuentes historicos, consejo nacional de cultura' (Roig, 1963 – 1964).
- 'Diez años de arquitectura en Cuba Revolucionaria' (Segre, 1970).
- 'Cuba, the architecture of the revolution' (Segre, 1977).

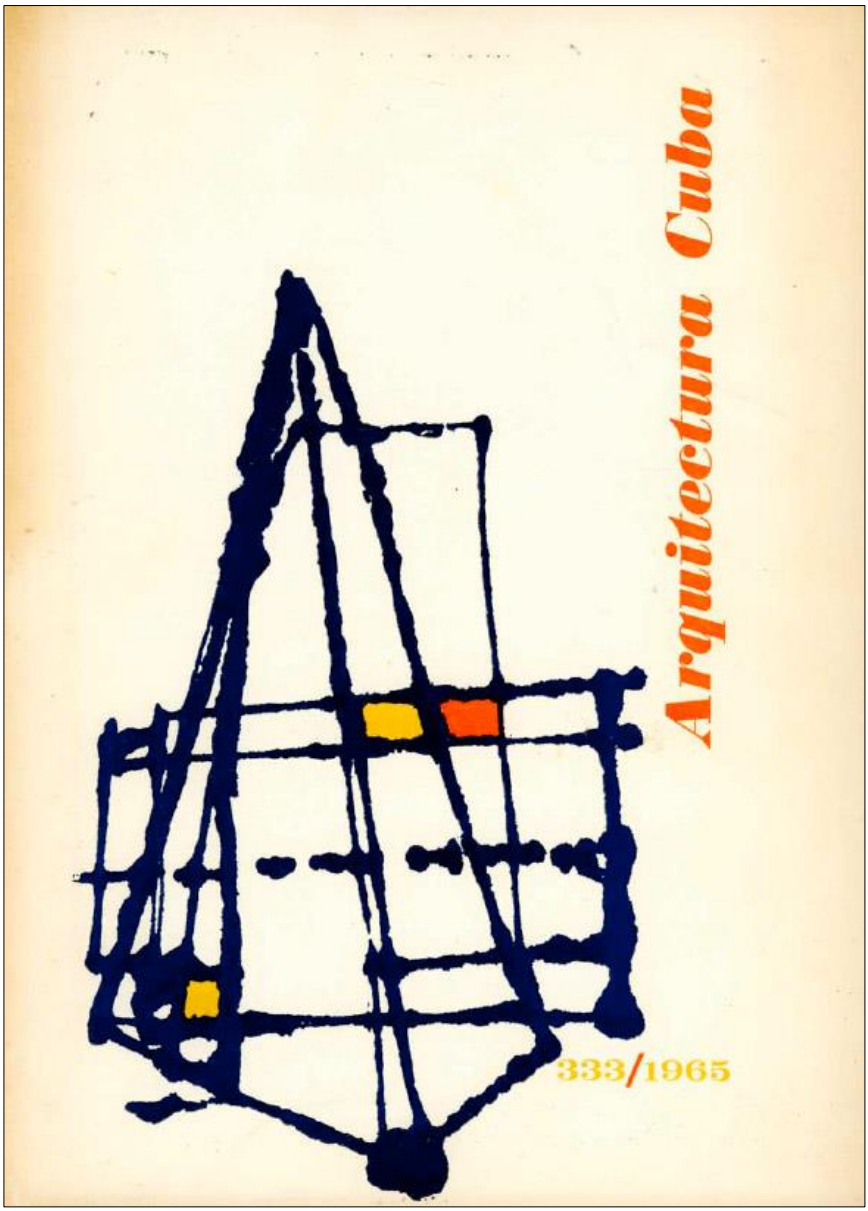


Figure 12. *Cover of "Arquitectura Cuba 333/1965" (Biblioteca Nacional De La Habana).*

With the introduction of these texts in the universities and with the growing interest in its Architectural heritage, Cuba began to take part in important international events.

In the 1980s, "The International Congress of Architecture and Urbanism" - a free organisation of progressive architects - was founded, inspired by the tradition of the International Congress of Modern Architects (CIAM) dissolved in 1959.

Cuba's participation in the Fourth Congress in Germany (1985) and the Fifth in Sweden (1987), as well as the Sixth Congress (1989) in Havana, increased the awareness on the value of modern architecture and promoted the introduction of courses on this subject within the national universities.

THE IMPORTANCE OF AWARENESS

«What I would like the most is awareness about the importance of Cuba's 20th-century architectural heritage, which does not exist, or is very limited.» (Rodriguez, 2012: 47).

The hope of Eduardo Luis Rodriguez (also the author of *La Arquitectura del Movimiento Moderno. Selección de Obras del Registro Nacional, do.co.mo_CUBA*, 2011) contributed to the reflection on the reasons for Cuba's lack of awareness on the value of the architecture produced during the Revolution. Indeed, there is almost a kind of stigmatisation of the post-revolutionary architectural heritage.

Excluding the coastal areas, inside the capital (fig. 13), tourism is concentrated almost exclusively in the restored and revalued *Habana Vieja*, Havana's historic centre. The Cuban protection system as well seems to promote the most central areas, dating back to the colonial period. The attention devoted to the redevelopment of *La Habana Vieja* is in fact not

remotely comparable with the neglect that the architecture of the second half of the 20th century has suffered and is still suffering. Perhaps as it is less understood in its innovative structural and technological aspects, due to the original use of new prefabrication components for the definition of the same expressive as well as distributive characteristics of the buildings (Azcue, 1989).

Resuming the slogan *Revolución es Construir*, after the military and political victory of 1959, the revolutionary government needed to face a new battle, no longer against an enemy in flesh and bones, but against social inequality to finally guarantee a dignified existence for every Cuban citizen.

Architecture was tasked of giving a new face to the entire state, not for the need of a new national architectural style - or simple improvements to urban fabric - but to respond to the enormous social and economic emergency in which the country had found itself upon overthrowing Batista's dictatorship (Cuadra, 2019).

Should the industrialization and typification of architecture considered a choice or an inevitable decision?

To meet the great challenges posed by the revolutionary government, architecture had to evolve in an extremely short period of time, adapting to the few building materials available on the island and the limited available funds. Moreover, politically and commercially isolated from the West, the alliance with the Soviet Union presented itself as the only possible way to import construction and architectural techniques based on the prefabrication and use of reinforced concrete. In conclusion, if Sergio Baroni's "Report" was intended to give a valuable judgement on what today is considered the "Cuban" architecture of the Revolution, this essay attempts to see its possible evolutions by observing, deepening and cataloguing the architectures built between 1960 and 1990. A period which led - thanks to

the careful use of geometry, functional distribution and construction elements - to unique examples of architecture that are not ascribable to standardization alone (Baroni, 1992).

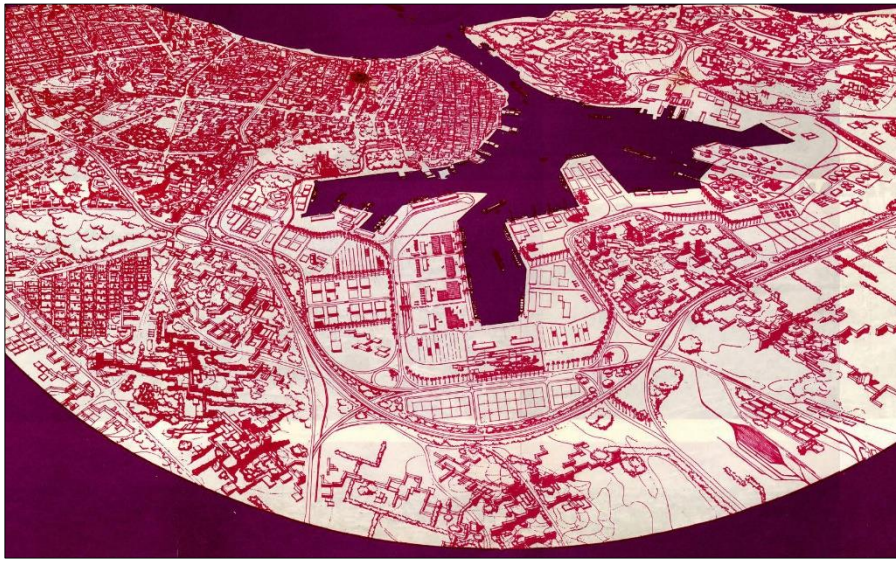


Figure 13. *Garatti, V. Design of the bay of Havana, 1971 – 1972 (Alini, 2020).*

An excerpt from Ernesto Guevara's speech at the closing of the 1st International Meeting of Professors and Students of Architecture, in Havana, in 1963:

> «In the beginning, the limitations were consistent; our scientists could not carry out the desired research. [...]
> Concretely, in the exercise of the profession you represent, a person's creative spirit is tested. [...]

The problem must be considered according to the materials at our disposal and the service they have to provide; the solution is what our experts must find [...]

Therefore, they must fight as if they were fighting against nature, against factors outside the will of man, so that they can realize their desire to build the new society with their own hands, with their own talent and knowledge, in the best possible way.» (Guevara, 1964: 13-14).

THE CASE STUDY OF PLAZA DE LA REVOLUCIÓN

The case of *Plaza de la Revolución* (fig. 14) - a place that, following the 1959 victory, became a symbol of political and revolutionary struggle – is useful to better understand the dynamics of protection, management and valorisation of Cuba's architectural heritage.

Figure 14. *Map showing the expansions of Havana (ARQUITECTURA CUBA No 340/ 1971).*

Built in the 1940s in memory of the Cuban patriot and martyr José Marti, it included, as a scenic backdrop, a large monumental tower dedicated to him. After the Revolutionary victory on 1 January 1959 the Square acquired a unique historical value testifying, to present days, the internationally recognized "theatre" of major gatherings of the people. This immense commemorative area has not been able to evolve over time, nor it has been able to reinvent itself for hosting events and activities open to citizens, despite the revalorization attempts. Between the end of the 1960s and the beginning of the 1970s, a team of urban planners and architects was tasked by the National Council of Culture with foreseeing and planning the future expansion and development of the city, defining the *Plan Maestro* (Azcue, 1989).

The urban area of *Plaza de la Revolución* was entrusted to Vittorio Garatti (already author of the ENA's Ballet and Music Schools in the former Country Club) who, recognizing the critical issues of the square, developed a requalification project (fig. 15).

The objective was to reduce the phenomenon of the "city" - i.e. a place rich in interest but populated only during daylight hours thanks to the presence of government buildings and cultural centres (like the national library) and emptied of meaning and social attractiveness at night and during non-working days. They, therefore, sought to create a new hub that, respecting the political-administrative function of the area, would encourage a constant and active presence of Cuban citizens and tourists. The result was supposed to be a cultural and recreational place that conserved the nature of the gathering area at the base of the monument named after José Marti unchanged. New central axis would have connected the square with the redeveloped area behind it, including commercial, recreational and educational activities (Alini, 2020).

Figure 15. *Garatti, V. Azcue, E. Quintana, A. Isoba, M. Galvez, S. The Masterplan of "Plaza de la Revolución" 1968 – 1971 (Alini, 2020).*

Despite the Cuban government's intentions, to date nothing has been realized of the valuable architectural, urban and functional proposal *for Plaza de la Revolución* envisaged in the 1968 Plan developed by Vittorio Garatti with Jean Pierre Garnier, Max Vaquero, Eusebio Azque, and Mario Gonzales.

In its current state, the square occupies an area of approximately 12 square kilometres, circumscribed by a carriageway ring consisting of roads with at least five lanes in each direction, and with the José Martí monument at its centre, surrounded by non-accessible green spaces and an extensive area of bare asphalt. The part considered to be a "gathering" space, which normally accommodates tourists and visitors interested in the site and the memorial is a rectangular widening of approximately 25,000 square metres furnished only by artificial lighting, completed and renewed in 2019. The lack of

services and attractions leads to an intense, but disoriented, flow of tourists. Buses and taxis pour in dozens of people who, after a quick glance and few photographs leave the area, further underlining the detachment from the principles and history that this place embodies. All of this further denotes how the only part of the city experienced by tourists remains La Habana Vieja, thanks to the many amenities present, such us museums, hotels, bars, restaurants, concert halls, cultural centres, and universities, among others (Collado et al., 2014).

However, the recent focus on the preservation of Cuba's 20th century architectural heritage and, in particular, the declaration by the DPPFH (*Dirección provincial planificación fisica de La Habana*) in 2012, has brought back to the forefront the still pending issues for Plaza de la Revolución. Among the initiatives, it is worth mentioning the Ideas Competition, with a deadline of 17 November 2022 (launched by TerraViva Competitions), for a redevelopment project for *Plaza de la Revolución*, aimed at positively reinterpreting the entire area to allow once again to express its full potential (Terraviva Competitions, 2022).

REFERENCES

Alini, I. (2020). *Vittorio Garatti - Opere e progetti*. Clean Edizioni, Napoli.

Azcue, E. (1989). "Plaza de la Revolución". *Arquitectura Cuba*, (374), 34 – 49.

Baroni, S. (1992). "Reporte de La Habana". *Zodiac*, (8), 161 – 184.

Barisone M. & Pozzi N. (2021). *Rapporto da La Habana. Indagine sull'Architettura Cubana 1960 – 1990. "Prime ipotesi per Plaza de la Revolución".* [Master Thesis, Politecnico di Torino]. https://webthesis.biblio.polito.it/17173/

Canella, G. (1992). "Laboratorio Latinoamerica". *Zodiac*, (8), 6 – 13.

Canella, GE. (2006). *Architettura di Retroguardia e laboratorio d'oltremare. Per una scuola nazionale di architettura all'Asmara*. CLUP, Milano.

Coyula, M. (2002). *Havana: Two Faces of the Antillean Metropolis.* The University of North Carolina Press.

Cuadra, M. (2019a). *La arquitectura de la revolución cubana 1959-2018*. Kassel University Press, Germany.

Cuadra, M. (2019b). *Aspiraciones y Espacios de una Revòlucion.* Kassel University Press, Germany.

Cuadra, M. (2019c). *De primera mano. Entrevistas con sus protagonistas y cronistas.* Kassel University Press, Germany.

Gaceta Oficial De La Republica De Cuba (1977). Edicion ordinaria. La Habana, 6 Agust 1977.

Garrudo, E. (1978). "Escuela vocacionales". *Arquitectura Cuba*, (347 – 348), 42.

Guevara, E. (1964). "Discurso del dr. Ernesto Guevara en la Clausura del Encuentro de Profesores y Estudiantes". *Arquitectura Cuba*, (331), 13 – 14.

Lapidus, L. (1966). "Ciudad Universitaria J. A. Echeverria". *Arquitectura Cuba*, (336), 15 – 16.

Leal, S. (2011). *"El patrimonio cultural cubano y su conservación"* available at: https://www.ipscuba.net/ipscuba-net/hemeroteca/archivo-hemeroteca/ck3-cultura-y-sociedad/el-patrimonio-cultural-cubano-y-su-conservacion/ (accessed 07 November 2022).

Cuba. (1961). *Leyes Del Gobierno Revolucionario De Cuba*. Finanzas al Dia, Ministerio de Hacienda Talleres de la Imprenta Nacional de Cuba.

Ley Federal Sobre Monumentos Y Zonas Arqueologicos. Artisticos E Historicos (1972), Diario Oficial, 6 May 1972.

Niglio, O. (2015). *Conservación de centros históricos en Cuba (Volumen I)*. Aracne Editrice, Roma.

Portuondo, J. (1966). "Por una arquitectura cubana y Socialista". *Arquitectura Cuba*, (336), 5 – 6.

Reglamento Para La Ejecución De La Ley 2 De Los Monumentos Nacionales Y Locales (1979). Decreto n° 55, availeble at: https://ru.unesco.org/sites/default/files/cuba_decreto55_spaorof.pdf

Rodriguez, E. L. (2012). *La Arquitectura del Movimiento Moderno Selecion de Obras del Registro Nacional.* Edicion Union. Collecion Arquitettura y Ciudad, Cuba – Avana.

Roig, L. (1963 – 1964). La Habana, apuentes historicos, Consejo nacional de Cultura, Cuba - La Habana. availeble at: https://archive.org/details/EmilioRoigDeLeuchsenringLaHabanaApuntesHistoricosTomoI/page/n7/mode/2up. (accessed 07 November 2022)

Salinas, F. (1971a). "La escuela revolucionaria como embrion de la comunidad futura". *Arquitectura Cuba*, (339), 2 - 4.

Salinas, F. (1971b). "La Revolucion en la educacion". Arquitectura Cuba, (339), 20 – 32.

Segre, R. (1970). *Diez años de arquitectura en Cuba Revolucionaria.* Union, La Habana.

Segre, R. (1977). *L'architettura della Rivoluzione*. Marsilio Editori, Venezia.

Segre, R. (2005). *Arquitectura y Urbanismo Modernos, capitalismo y socialismo*. Felix Varela, Cuba - Avana.

Semerani, L. (2001). "Cuba Le scuole nazionali delle arti a L'Avana, Vittorio Garatti, Roberto Gottardi e Riccardo Porro". *IUAV, giornale di istituto* (7), 1 – 12.

Spengler L. (2011). *El patrimonio cultural cubano y su conservación, cultura y sociedad*. Availeble at: https://revistaconsinter.com/revistas/ano-vi-numero-xi/capitulo-01-direitos-difusos-coletivos-e-individuais-homogeneos/la-proteccion-del-patrimonio-cultural-una-vision-desde-el-derecho-cubano/(accessed 07 November 2022)

Terraviva Competitions (2022, Nov 7). *The Cuban Square a Public Space [r] Evolution in Havana*. Terravivacompetitions. Retrieved November 7, 2022, from https://www.terravivacompetitions.com/the-cuban-square-competition-2022/

Zardoya, L. (2019). *La Arquitectura de La Revolución Cubana 1959-2018*. Kassel University Press, Germany.

Journal of Architecture, Arts and Heritage (JAH) – Vol. 1, Issue 2, November 2022
e-ISSN: 2822-437X

3D Architectural Heritage Platform

Ali Akif Yörük[1]
Ankara Yıldırım Beyazıt University
195101124@ybu.edu.tr
ORCID No: 0000-0002-0276-5635

Muhammed Abdullah Bülbül[2]
Ankara Yıldırım Beyazıt University
abulbul@ybu.edu.tr
ORCID No: 0000-0002-2527-2729

Salah Hajismail[3]
Ankara Yıldırım Beyazıt University
salah.hajismail@aybu.edu.tr
ORCID No: 0000-0001-6682-6663

Submission Date: 01.09.2022 / Acceptance Date: 09.09.2022

ABSTRACT

In recent years, efforts to digitalize cultural heritage have increased with the developing technology. With the development of three-dimensional (3D) imaging technologies and communication opportunities, the transfer of tangible cultural heritage to the digital environment has accelerated. Many academic and industrial studies have been conducted and methods have been developed in the fields of creating and displaying 3D models of cultural heritage artifacts.

For digitally transferred data to be shared online with other users, there is a need for systematic storage of information, images, and 3D models of cultural heritage. These storage systems help protect our cultural heritage. In addition, it can provide benefits in areas such as restoration work. Storing cultural heritage digitally makes us need a cultural heritage database.

In this project, information and 3D models of the architectural heritage are recorded. Users can view architectural heritage models stereo enabled 3D environments, interact with them and get information about artifacts with this platform.

Before the architectural heritage data is added to the system, its compatibility with architecture, virtual reality (VR) and augmented reality (AR) is checked by authorized users. It is then added to the system with the approval of authorized users. In addition, these models are displayed in VR.

As a result, a system has been created that can be used by researchers from different disciplines, thus enabling academic collaborations to be established. This platform contributes to the registration, promotion and protection of architectural heritage.

KEYWORDS
Architectural Heritage, Digital Cultural Heritage, 3D Modeling, 3D Model Database, Virtual Reality

INTRODUCTION

Cultural heritage is the reflection and expression of people's values, beliefs, knowledge, and traditions from past to present (Selanik & Kurtdede, 2013). Historical and cultural artifacts transferred from the past to the present provide information about ancient life, language, religion, literature, tradition, and architecture (Yastıklı et al., 2022). Establishing a connection between the past and the present creates a foundation for the culture and the world in which one lives. While providing a solid reference in the creation of the future, it also enriches human lives in a spiritual sense.

Cultural heritage, in its meaning, is the values that remind societies and members of these societies of a common past, provide the continuity of the experiences and traditions that people have accumulated throughout history, and guide future formations (Kuşcuoğlu & Taş, 2017; Yastıklı et al., 2022).

Today, with the developing technology, it has become possible to transfer the tangible cultural heritage to the digital environment with the possibilities of modeling, photographic recording, and communication. Many academic and industrial studies are conducted in this field. The use of three-dimensional realistic models in fields such as education, cinema, and games has become widespread, and applications that provide virtual visits to historical and touristic places have begun to emerge (Kersten et al., 2018; Kiourt et al., 2016).

Today, historical artifacts can be transferred to a nearly real-like three-dimensional (3D) environment by modeling software or methods such as photogrammetry and laser scanning. The common 3D model file formats include STL, OBJ, FBX, COLLADA, GLTF and others. The main purpose of a 3D file format is to save information about 3D models as plain text or binary data. They specifically encode the textures, appearance, scenes, and animations of the 3D model. 3D printing, video games, movies, architecture, academia, medicine, engineering, and earth science all use them. While all these developments cause the diversification and spread of 3D environments; it has increased the need for platforms where specialized 3D content such as architectural works are organized (Yiğit & Uysal, 2021).

In recent years, the creation and use of projects and platforms for the sharing and regulation of cultural heritage in the digital environment have accelerated. The ARIADNEplus project (Richards & Niccolucci, 2019), supported by the European Union Horizon 2020, which started in 2019, includes the digital editing and sharing of more than one million archaeological resources, most of which are in Europe. The platform named EUROPEANA (URL-1) also includes the online presentation of the very wide-ranging cultural heritage (such as books, music, and works of art) in Europe. 3D models of works are rarely found on this platform.

In Türkiye, the transfer of cultural heritage to a digital environment has accelerated in recent years. Researchers and other users can view cultural heritage information online and in three dimensions with these studies. In a study by Arca et al. (2018); works of 3D models of cultural heritage in the historical city of Safranbolu were created and the works in the database were shared on the web (Arca et al., 2018). In a study by Altuntaş et al. (2019); three-dimensional models of Sultan Selim Mosque and Yusuf Ağa Library in Konya were created (Altuntaş et al., 2019). Another study, the Adalar Architectural Heritage Database (URL-2), shares information about the

architectural artifacts found in Istanbul islands over the internet. 3D models are not included in this project.

PURPOSE

The main purpose of the platform created with this project is to store and record artifacts related to architectural heritage. Thanks to this platform, access to three-dimensional models of architectural heritage artifacts and necessary information such as the coordinates and details of these models on the map will be provided.

A database has been created on the platform, where 3D models of architectural heritage data, photographs, and information about the data will be found. A web interface has been created where users can upload 3D models of architectural heritage data, view existing 3D models interactively and approve the information about this data by authorized users. The web interface is user-friendly and provides quick responses. It is aimed to ensure that these 3D models are efficiently pulled from the created database and viewed with virtual reality glasses.

ORIGINALITY

There is a need for systematic storage of information, images, and 3D models of cultural heritage in order to share digitally transferred data with other users online. In general, there are websites such as Sketchfab and Turbosquid where 3D models are stored and offered to other users for free or for some fees. These applications contain 3D models of architectural artifacts, but do not retain information specific to architectural heritage. The proposed system, supported by virtual reality, creates a digital infrastructure that offers unique value for architectural heritage.

Generally;

- An infrastructure has been created where explanations, photographs, 3D models and other documents related to the architectural heritage will be used in a beneficial way.
- A web project is developed that allows researchers and other users to access information in the database, enter data, view and position three-dimensional models interactively.
- Three-dimensional model of architectural heritage data is displayed in virtual reality environments.
- Architectural heritage data, which has been partially destroyed or lost by natural or artificial means, is displayed in a virtual reality environment after being uploaded to the system based on data from past photographs, drawings, or other documents

METHOD

This platform, created for architectural heritage, consists of database, web, and virtual reality parts (Fig. 1).

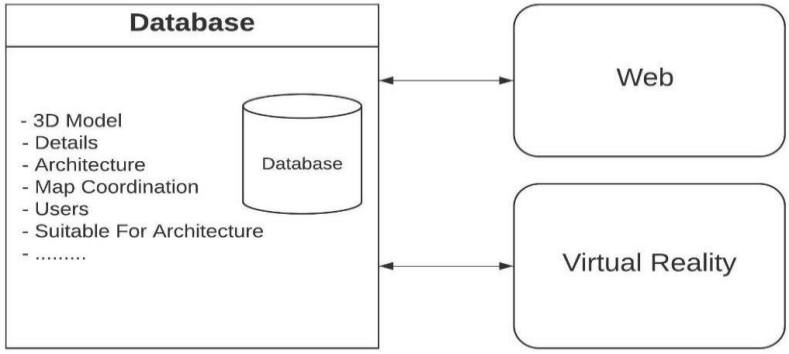


Figure 1. *Project Workspace Overview.*

DATABASE

A database (Raut, 2017) is a means of storing information such that data can be stored and retrieved from it as needed. From its inception in the 1960s

until now, different types have emerged, each using its own representation of data and technology to drive transactions. First, relational databases, then object-oriented and recently NoSQL databases have been used (Raut, 2017).

The architectural heritage database (AHD) is one of the main parts of the system. The database provides storage of architectural heritage related data for record keeping. PostgreSQL, which is a relational database, was used for the AHD.

E.F Codd invented the relational database in 1970 (Li, 2018). A relational database is a collection of data items organized in formally defined tables, in which data can be accessed or reassembled in many different ways (Jatana et al., 2012). Relational databases are databases that allow us to identify and access data in relation to other data. In a relational database, data is usually kept in tables. Tables consist of rows and columns. This table/row/column structure allows relationships to be easily defined. Each row contains a unique data sample for the corresponding data category.

When creating a relational database, the domain of possible values, along with constraints, is applied to the data. It is the relationship between tables that makes it a 'relation' table (Jatana et al., 2012).

Relational database management systems (RDBMS) are software that performs the tasks of creating, updating, and managing a relational database (Verber, 2022). Most RDBMS use SQL (Structured Query Language) for accessing and interacting with databases (Verber, 2022).

Relational Databases are based on ACID model (i.e. Atomicity, Consistency, Isolation and Durability (Liu et al., 2016)). The ACID model of database design is an important concept of database theory. The ACID establishes the requirements for atomicity, consistency, isolation, and durability for a database management system. Any relational database that does not

accomplish one of these four objectives is not dependable. The ACID provides consistency and usability as powerful features that make relational databases popular (Kunda & Phiri, 2017). Each of the four ACID attributes follows well-defined standards:

- Atomicity: In the shortest terms, atomicity states that database changes should follow the all-or-nothing rule. Either all operations must be successful, or even if one fails, they must all be canceled.
- Consistency: Consistency states that only valid data will be written to the database. If a transaction results in the production of invalid data, the database retrieves the data back to the most recent current state. A transaction can only update the database from one current state to another current state
- Isolation: Isolation requires that multiple transactions occurring at the same time do not impact each other's execution. Multiple simultaneous transactions are guaranteed to be independent via isolation (Kunda & Phiri, 2017).
- Durability: Durability is the storage of the data of the transactions completed by committing in a stable, durable, and continuity-guaranteed environment (such as a hard disk) in unexpected situations such as hardware failure, the transaction log, and received backups are also important in the name of adherence to the principle.

There is a huge amount of data nowadays. While the need for a data storage technology that works more effectively on the cluster in dealing with this data is increasing day by day, the NoSQL concept has been put forward as a solution to this need (Davoudian et al., 2018). NoSQL databases store data in a non-tabular way, unlike a relational database (Davoudian et al., 2018).

The CAP theorem is included in NoSQL databases (Li, 2018). The CAP theorem:

- Consistency: Consistency means that the nodes will have the same copies of a replicated data item visible for various transactions. All nodes in the distributed system must have the same data.
- Availability: Availability is the situation in which every request made to the system can receive a response, regardless of whether it is successful or not, even if it does not have the most up-to-date data.
- Partition Tolerance: Even if some of the existing nodes become inaccessible due to a network or other reason, the system can continue to work.

CAP theorem (Fig. 2) states that at most two out of the three properties (Consistency, Availability, and Partition tolerance) can be achieved simultaneously in distributed environments.

Strong consistency ensures that data appears consistently after transactions are performed. According to NoSQL, Relational Databases offer stronger consistency with solid schema (Sing, 2016).

NoSQL has tried to achieve higher performance and accessibility by compromising the strong and instantaneous data consistency of RDBMS. Relational database also has strong security mechanisms used to protect data (Abourezq & Idrissi, 2016).

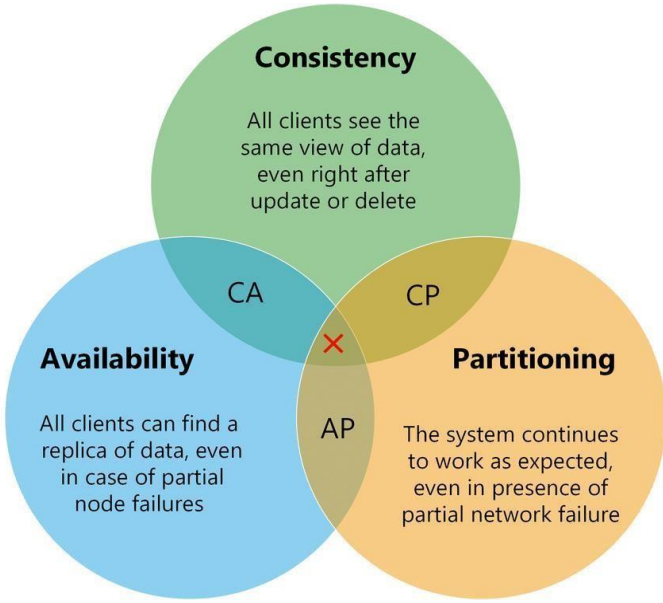


Figure 2. *CAP Theorem (URL-3).*

Every user should see a consistent version of the data. This includes changes made by the user himself and changes made by other users. Accordingly, even when the user himself or another user performs the operation at the same time, he will need consistent architectural heritage data. For this reason, the relational database was preferred in the project as data consistency and security are more important than NoSQL. At the same time, the Relational database was used in the project for reasons such as supporting acid property and supporting operations (complex operations as well as joins) as mentioned before.

An entity-relationship model of the database created to keep information about architectural heritage efficiently, in which the relationships between the data are indicated (Fig. 3).

Model Suitable table keeps information such as the compatibility of architectural heritage data with architecture, augmented reality and virtual

reality. If a data is not suitable for any of these, it will not be added to the system since authorized persons will not approve them. When authorized persons reject the data due to any nonconformity, the disclosure information is also kept in this table.

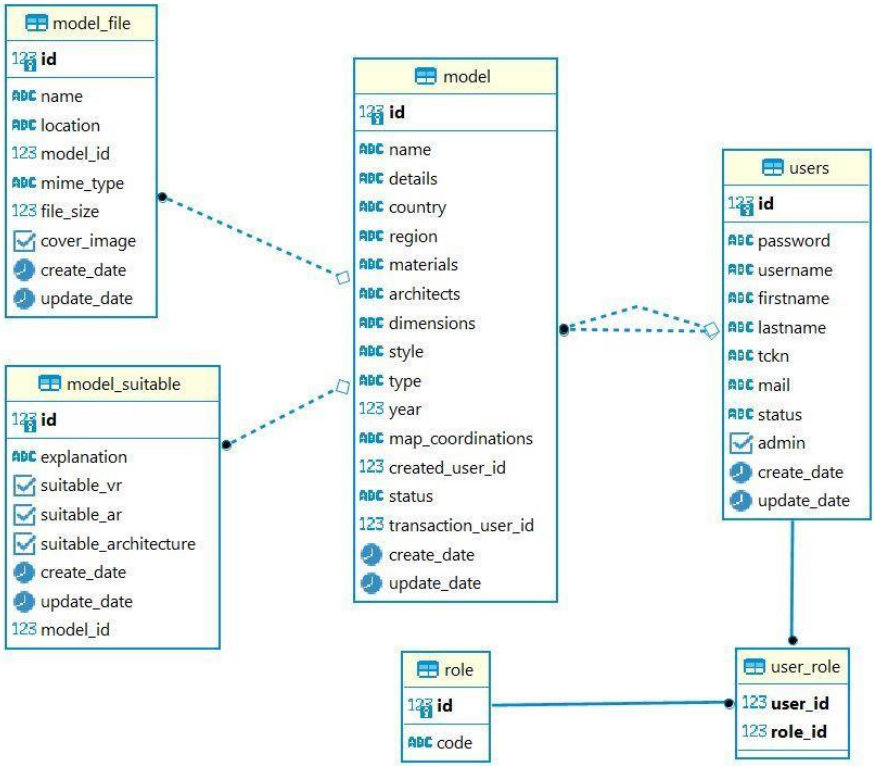


Figure 3. *An entity-relationship (ER) model in which the relationships between the data of the created database are shown.*

In the model table, information about the architectural heritage data are kept. This information includes features such as model name, details, year, architects, coordinates and physical condition.

Artifacts in the architectural heritage data are divided into five classes according to their current physical condition, and this information is stored in the model table (Grilli et al., 2018) (Fig. 4):

1. Completely lost: Artifacts that have not survived physically; as it can be learned through information such as tablets and drawings found in archaeological sites, artifacts that have been destroyed in the recent past due to reasons such as war and natural disasters are also in this class. It may be possible to obtain information about the works from architectural plans, visuals, explanations and descriptions in written texts (Fig. 4A).
2. Ruins: These structures are mostly found in archaeological sites and unearthed through excavations. Although most of it is gone; It is possible to reach useful information about the structure of the work, the materials used and the architectural methods (Fig 4B).
3. Remains: Most of the works in this class have survived and information about the missing parts can be obtained from different sources such as written texts, drawings and plans (Fig. 4C).
4. Artifacts that have survived to the present day in their original form: Artifacts that have survived to the present day, except minor restorations, which did not need any intervention, fall into this category (Fig. 4D).
5. Remaining to the present day by changing in the historical process: Artifacts that have been transformed or reconstructed for reasons such as destruction, political changes, and technological developments throughout history fall into this category. The historical transformation of such works should also be recorded (Fig. 4E).

Figure 4. *Examples of architectural heritage belonging to different classes according to their Physical Condition.*

Files of architectural heritage data are kept in the Model File table. Information about the 3D files, texture files and photographs of the data are kept in this table. Amazon Simple Storage Service (Amazon S3) is used to store the files of the data. This service is preferred because it is an object storage service that offers scalability, data availability, security and performance. User information is kept in the users' table. In the role table, there are authorizations such as adding a model and approving the model. The information about which role the users have, is also kept in the database.

WEB

A web project has been developed for the effective use of architectural heritage data. With this project, users will be able to add architectural heritage data, view 3D models interactively, and view details of architectural heritage data (Fig. 5, Fig. 6).

Figure 5. *An example image from the web project.*

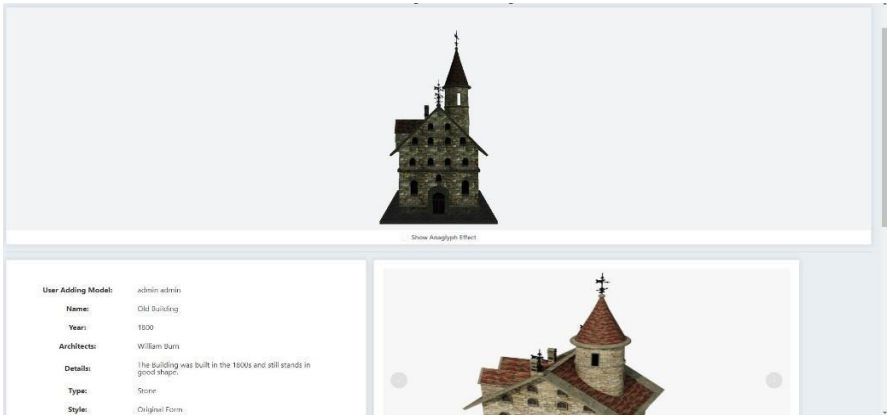


Figure 6. *An example image from the web project.*

In the web project Spring Boot is used for the server and Vue.js is used for the frontend. Spring boot interacts with the database on request. Vue Client sends HTTP Requests and receives HTTP Responses using axios and displays data about components. In addition, the Vue Router is used to navigate the pages. The architecture created for the web project is shown (Fig. 7).

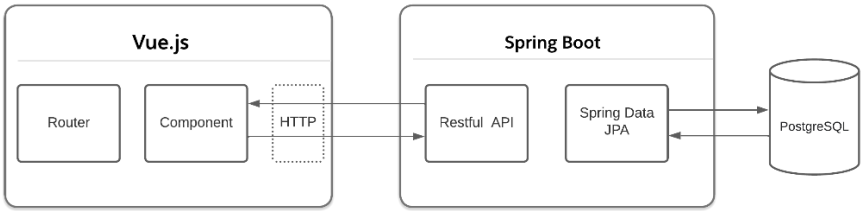


Figure 7. *Architecture Designed of Web Project.*

Frontend

Frontend allows users to have a nice experience while interacting with the interface. It is important to optimize front-end performance when building applications, as it plays an important role in web applications (Sianandar & Manuaba, 2022).

Vue.js is a progressive framework for building user interfaces. Unlike other monolithic frameworks, Vue.js was designed from the ground up to be progressively acceptable. It is not only easy to use, but also easy to integrate with third-party libraries or existing projects. According to the design idea of MVVM (model-view-view model), Vue.js realizes two-way binding of data and view, reducing the connection degree of each part, and more flexible to use. Vue.js is widely used in developing web-based applications (Kyriakidis et al., 2016; Zhang et al., 2021; Sianandar & Manuaba, 2022).

The Vue.js framework can be directly integrated into the Spring Boot framework, and the Spring Boot framework can help complete autoconfiguration (Zhang et al., 2021). A schematic diagram of the MVVM mode of the Vue.js framework (Fig. 8). The Vue.js framework was chosen because of its ease of use, progressive framework, and easy integration with third-party libraries.

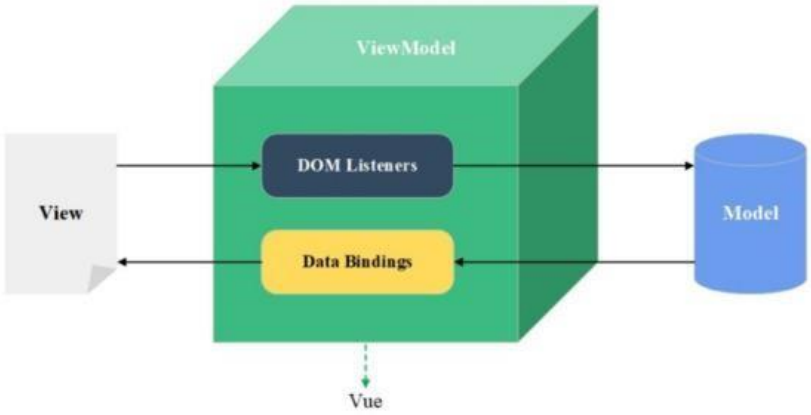


Figure 8. *Schematic diagram of MVVM mode of Vue.js framework (Zhang et al., 2021).*

The web application provides data viewing and user interaction, and also enables artifacts to be displayed in 3D and positioned on the map.

The 3D models taken from the database are displayed in 3D on the browser with WebGL, the version of OpenGL that works in internet browsers. At the same time, the Three.js library is used to display models in 3D. Three.js is a 3D JavaScript library that enables developers to create 3D experiences for the web. With the Three.js library, they are able to use features such as zoom in, zoom out, rotating on models. It is also provided to display 3D models as anaglyphs.

Three.js is used in the web application because the Three.js library provides loaders for various 3D file formats and supports the anaglyph feature.

Google Maps was used to position the 3D Models on the map. Google Maps was chosen because it offers a robust set of APIs for creating and interacting with maps, visualizing location data, and searching via autocomplete. While adding architectural heritage data in the web application, it can be positioned by moving the marker on the map or by entering the longitude and latitude information.

What is Anaglyph?

The most widely used and affordable 3D visualization technique is anaglyph. For this reason, it has started to be used in many 3D applications. Anaglyph 3D is a stereoscopic 3D effect achieved by coding the image of each eye using filters in colors, typically red and cyan. Two separate filtered color images, one for each eye, are included in anaglyph 3D images. Each of the two pictures reaches the targeted eye when seen through "color-coded" "anaglyph glasses," creating an integrated stereoscopic image. The visual cortex of the brain combines this with the perception of a three-dimensional scene or composition (Dhaou et al., 2019).

Server

The Spring Boot framework is the basic component that is responsible for collecting, storing data from the data collection layer. In addition, The Spring Boot framework receives and processes data requests from the display interface layer, as well as provides a standard data interface to external programs (Zhang et al., 2021).

The Spring Boot framework is a subproject within Spring project. The Tomcat server is integrated inside the Spring Boot framework, which can run directly without deployment. The Spring Boot framework is easy to configure and is preferred and used because it runs the tomcat server directly (Miao et al., 2020).

Spring Data JPA is preferred to perform data layers operations. Spring Data is part of the Spring library. Spring Data JPA is not a JPA provider. It is a library that adds an extra layer of abstraction on top of our JPA provider (like Hibernate). Spring Data is an abstraction used to significantly reduce the amount of source code required to implement data access layers.

Restful API is used for data flow between client and server.

REST is a software architectural style that defines the set of rules to be used for creating web services. REST provides communication between client and server, working over HTTP protocol (Fig. 9). It provides communication of the application by carrying XML and JSON data between client and server. Services using REST architecture are called RESTful services (RESTful API).

Rest uses the HTTP protocol to exchange data and files over URL addresses. When a request is made to a URL, a response in URL JSON or XML format is returned, the response is parsed, and the request is completed. REST client-server can communicate easily even if hosted on different servers.

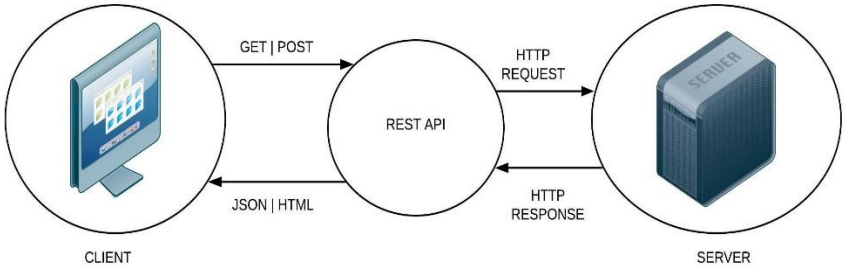


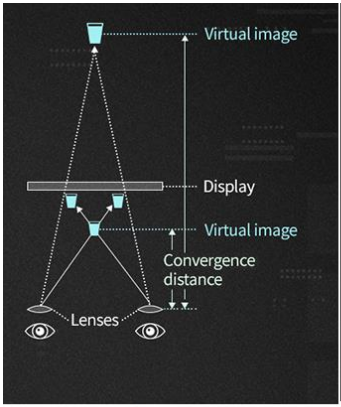
Figure 9. *Rest Software Architecture.*

HTTP requests are:

- GET is used to list and display data.
- POST is a request to add data
- DELETE is used to delete data
- PUT updates data if it exists, adds it if it is not

VIRTUAL REALITY

The purpose of the virtual reality (VR) application is to display the three-dimensional models in the architectural heritage database in the virtual reality environment. The device that will perform the imaging is the Google Cardboard derivative virtual reality devices, which are more convenient for widespread use due to their price. These devices work with the principle of creating a binary (stereo) image on the smartphone screen placed inside (Fig. 10A). By dividing the phone screen in the horizontal position into two halves, the image created for the right eye is shown on the right side, and the image created for the left eye is shown on the left side. The lenses on the screen bring the perceived screen distance to a reasonable level. Head movements are detected with motion sensors on the phone and the user is given the opportunity to look in desired direction (Fig. 10B).



A- Principle Of VR

B- VR image example

Figure 10. *VR principle and VR image example (URL-4).*

FLOW OF THE PROJECT PROCESS

Unregistered users must register to access the platform. They can then gain access to the platform. Authorized users can change the roles of existing users or newly registered users. They can give users the authority to “Add Models” and “Confirm Models". Only users with the "Add Model" authorization can add architectural heritage data after entering the required information (Fig. 11).

Before adding the architectural heritage data system on the model add page:

a. 3D model files of architectural heritage data can be viewed interactively (Fig. 12).
b. Photographs of architectural heritage data can be viewed (Fig. 13).
c. By moving the marker on the map or by entering the coordinates, the coordinate where the architectural heritage data is located can be determined (Fig. 14).

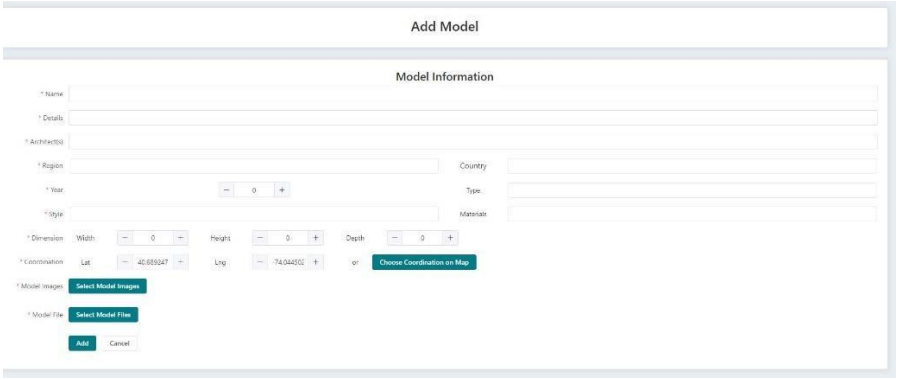


Figure 11. *Model add page, after entering the information here, the model is added.*

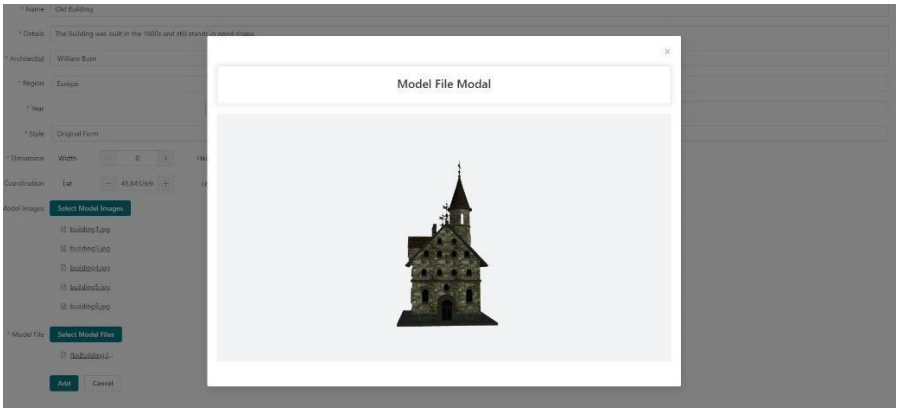


Figure 12. *Model is displayed in 3D on the Add Model Page.*

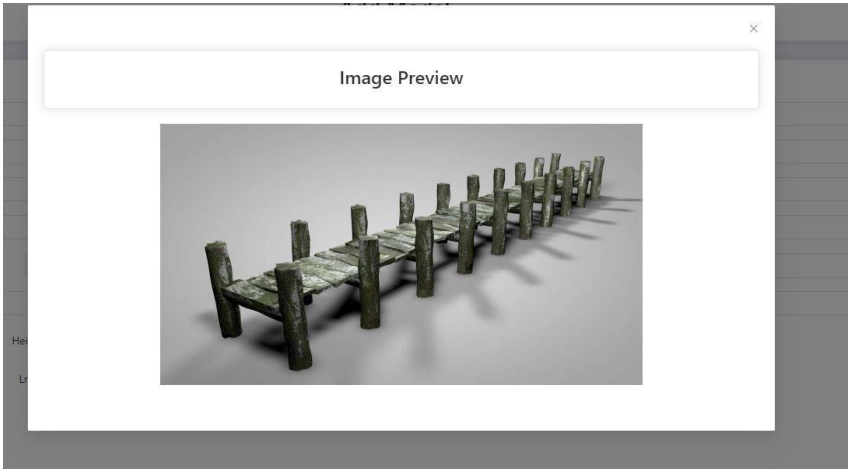


Figure 13. *Photographs of model can be viewed on the Add Model Page.*

The compliance of “architecture, VR, and AR” is checked by users with the “Confirm Model” authorization for newly added architectural heritage data or existing architectural heritage data (Fig. 15). If it provides all these three features, it is approved by authorized persons and added to the system.

If any property is not provided, it rejects the data by adding a comment. After the user corrects the data, it is reviewed again.

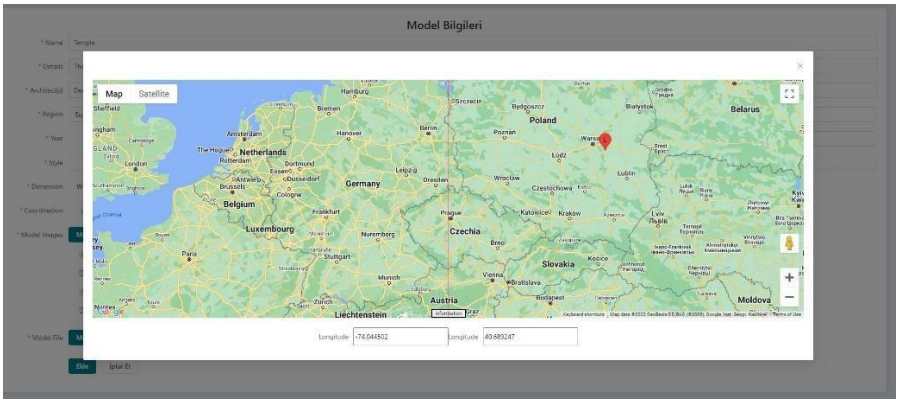


Figure 14. *Map on Add Model Page.*

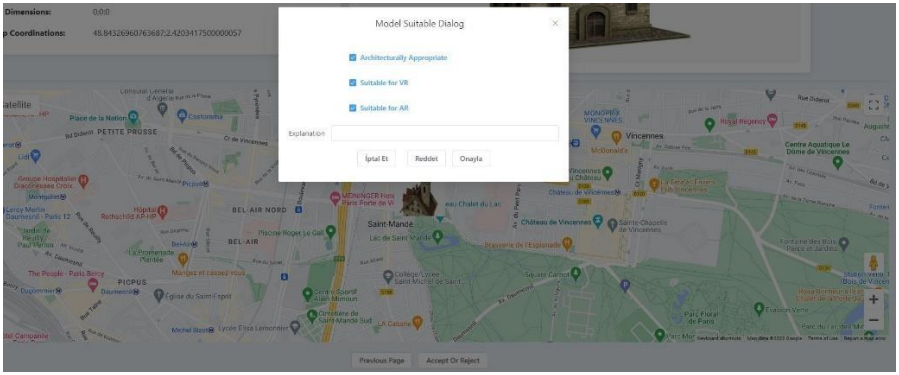


Figure 15. *The compliance of "architecture, VR, and AR" is checked by users with the "Confirm Model" authorization.*

The confirmed architectural heritage data can be viewed by anyone in the system (Fig. 5).

Details of architectural heritage data can be viewed on the detail page as follows:

a. 3D model of architectural heritage data is displayed interactively.
b. The 3D model of architectural heritage data can be displayed as anaglyph (Fig. 16).

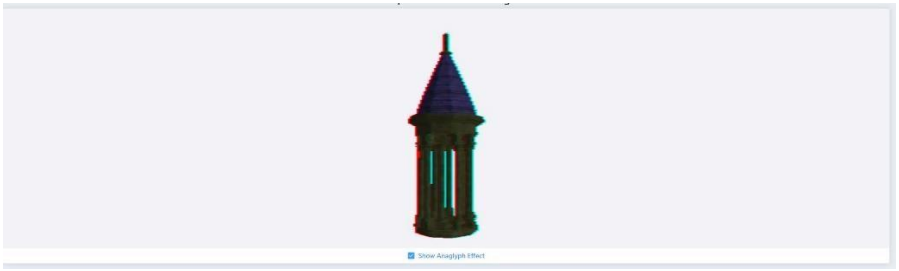


Figure 16. *Example of anaglyph effect of 3D model.*

c. Detailed information and photos of architectural heritage data are displayed (Fig. 17).

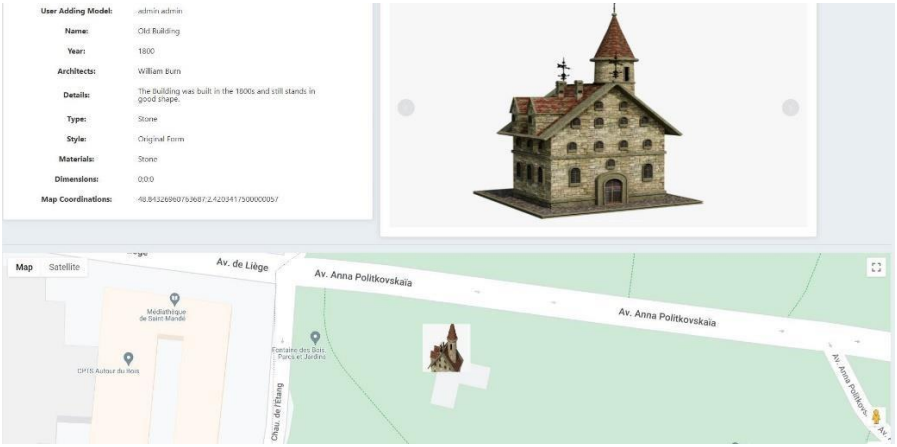


Figure 17. *On detail page, an example image of the data and location information.*

d. The location information of the architectural heritage data is displayed on the map (Fig. 17).

CONCLUSION AND RECOMMENDATIONS

In recent years, developments in digital photogrammetry and computer technology have also significantly affected the spread of cultural heritage on digital platforms. Thanks to this created platform, it is ensured that cultural artifacts are recorded. In addition, 3D models of architectural heritage are displayed interactively with this platform. Since the platform also supports virtual reality, virtual tours can be made around and inside cultural structures.

The 3D architectural heritage platform allows recording the current state of heritage that has been damaged, partially destroyed, or lost by natural or artificial means. It can also be shown by recording the changes that the heritage has undergone over time. The platform enables users to witness history by displaying cultural artifacts in virtual reality environments in three-

dimensions. In this way, people can gain social and interactive experiences that combine learning with fun.

Architectural heritage artifacts that have been destroyed or in need of restoration can be restored in a way that protects the cultural heritage by making use of this platform. In addition, through this platform, a system has been created that can be used by people from different disciplines such as computer science, architecture, archeology and urban planning, and that allows various collaborations to be established.

In line with the results of the study, it is recommended to write an augmented reality application using this platform. Thanks to this application, it is possible to display the architectural works in their real location, allowing users to see the past images of the works in the present time period.

As a result, keeping up with the times with the developments in technology, it is possible to protect and sustain the cultural heritage and transfer it to future generations. In the future years, important developments can be seen in many areas such as tourism, with the provision of physical and digital access to cultural heritage.

REFERENCES

Abourezq, M., & Idrissi, A. (2016). Database-as-a-service for big data: An overview. *International Journal of Advanced Computer Science and Applications*, *7*(1), 157-177. DOI: 10.14569/IJACSA.2016.070124

Altuntaş, C., Mert, S., Yaman, G., Cengiz, Y., & Sönmez, M. (2019). Photogrammetric Wireframe and Dense Point Cloud 3D Modelling Of Historical Structures: The Study Of Sultan Selim Mosque and Yusuf Aga Library in Konya, Turkey. In *2ND INTERNATIONAL CONFERENCE OF GEOMATICS AND RESTORATION (GEORES 2019)*. COPERNICUS GESELLSCHAFT MBH.

Davoudian, A., Chen, L., & Liu, M. (04 2018). A survey on NoSQL stores. *ACM Computing Surveys,* 51, 1–43. DOI: 10.1145/3158661

Dhaou, D., Ben Jabra, S., & Zagrouba, E. (2019, June 1). A Review on Anaglyph 3D Image and Video Watermarking. *3D Research*. 3D Display Research Center. DOI: 10.1007/s13319-019-0223-1

Grilli, E., Dininno, D., Petrucci, G., & Remondino, F. (2018). From 2D to 3D supervised segmentation and classification for cultural heritage applications. In *ISPRS TC II Mid-term Symposium "Towards Photogrammetry 2020"* (Vol. 42, No. 42, pp. 399-406).

J Sianandar, J., & Manuaba, I. B. K. (2022, August). Performance Analysis of Hooks Functionality in React and Vue Frameworks. In *2022 International Conference on Information Management and Technology (ICIMTech)* (pp. 139-143). IEEE.

Kunda, D., & Phiri, H. (2017). A comparative study of nosql and relational database. *Zambia ICT Journal*, *1*(1), 1-4. DOI: 10.33260/zictjournal.v1i1.8

Kuşçuoğlu, G. Ö., & Murat, T. A. Ş. (2017). Sürdürülebilir kültürel miras yönetimi. *Yalvaç Akademi Dergisi*, *2*(1), 58-67.

Kyriakidis, A., Maniatis, K., & You, E. (2016). *The majesty of Vue. js*. Packt Publishing.

Liu, Z. H., Hammerschmidt, B., McMahon, D., Liu, Y., & Chang, H. J. (2016, June). Closing the functional and performance gap between SQL and NoSQL. In *Proceedings of the 2016 International Conference on Management of Data* (pp. 227-238).

Li, Z. (2018). NoSQL Databases. In John P. Wilson (Ed.), *The Geographic Information Science & Technology Body of Knowledge* (2nd Quarter 2018 Edition). DOI: 10.22224/gistbok/2018.2.10

Miao, K., Li, J., Hong, W., & Chen, M. (2020). A microservice-based big data analysis platform for online educational applications. *Scientific Programming*, *2020*, 1-13. DOI: 10.1155/2020/6929750

Jatana, N., Puri, S., Ahuja, M., Kathuria, I., & Gosain, D. (2012). A survey and comparison of relational and non-relational database. *International Journal of Engineering Research & Technology*, *1*(6), 1-5.

Raut, A. B. P. D. (2017). NOSQL database and its comparison with RDBMS. *International Journal of Computational Intelligence Research*, *13*(7), 1645-1651.

Richards, J., & Niccolucci, F. (2019). *The ariadne impact*. Budapest: ARIADNEplus Consortium, and Archaeolingua Publishing House.

Selanik Ay, T., & Kurtdede Fidan, N. (2013). Öğretmen Adaylarının Kültürel Miras Kavramına İlişkin Metaforları. *Electronic Turkish Studies, 8*(12), 1135-1152. doi: 10.7827/TurkishStudies.5982

Singh, A. (2016). NoSQL: A new horizon in big data. *International Journal of Scientific Research in Science, Engineering and Technology*, *2*(2), 1183-1188.

Verber, D. High-Performance Computing with Relational Database Management Systems. In *Austrian-Slovenian HPC Meeting 2022–ASHPC22* (p. 41).

Yastikli, N., Çetin, Z., & Asamaka, E. (2022). The production of line-drawing and 3D modeling of historical Mehmet Ali Bey Fountain with SFM approach. *Cultural Heritage and Science*, *3*(1), 19-24.

Zhang, F., Sun, G., Zheng, B., & Dong, L. (2021). Design and Implementation of Energy Management System Based on Spring Boot Framework. *Information*, *12*(11), 457. DOI: 10.3390/info12110457

URL-1. Discover Europe's Digital Cultural Heritage. (n.d.). Retrieved November 3, 2022, from https://www.europeana.eu/en

URL-2. Adalar Müzesi - Museum of the princes' islands. (n.d.). Retrieved November 3, 2022, from https://www.adalarmuzesi.org/cms/projeler/mimari-mirasveritabani

URL-3. Köse, S. (2021, December 7). *Microservice Mimari'lerde Veritabanı Tasarımı - Devops Türkiye* Medium.

https://medium.com/devopsturkiye/microservice-mimarilerde-veritaban%C4%B1-tasar%C4%B1m%C4%B1-d58371ec466

URL-4. Metcalfe, T. (2017, April 6). *Ancient Jerusalem Comes Alive in New Virtual-Reality App*. livescience.com. https://www.livescience.com/58566-ancient-jerusalem-reconstructed-in-virtual-reality-app.html

Journal of Architecture, Arts and Heritage (JAH) – Vol. 1, Issue 2, November 2022
e-ISSN: 2822-437X

Meeting Room Acoustic Design in the Historical Building: The Example of Istanbul University Faculty of Science and Letters Building

Tarık Serhat Bozkurt[1]
Istanbul Technical University, Department of Architecture
bozkurtt@itu.edu.tr
ORCID ID: 0000-0001-5642-4986

Submission Date: 09.10.2022 / Acceptance Date: 23.11.2022

ABSTRACT

In the restoration of historical buildings, the characteristics of the original period and the design decisions of the original period should be preserved. The rich interior volumes of historical buildings should not be reduced, the original ceiling height should not be changed and their original interior forms should be conserved. In addition, the requirements of current standards in the restoration of historical buildings should be met as much as possible. Providing auditory comfort conditions is also one of the important parameters in the restoration process. In this study, the meeting room in the historical building was analysed, the design decisions of the original period of the meeting room were preserved, and an acoustic improvement project was presented depending on the characteristics of the historical building. In the acoustic project proposal, the original room height, the richness of the interior volume, and the perception of the mirrored vault system were preserved to maintain original period design decisions. In the acoustic project proposal, auditory comfort conditions were improved by increasing the total absorption rate in the meeting room. Reverberation time analyses and delayed reflection analyses were performed. In addition, the homogeneous propagation of the sound in the space was examined by using the acoustic simulation program. With the acoustic project proposal, the reverberation time was controlled in line with the DIN18041 standard, the delayed reflections were greatly reduced, the homogeneous propagation of the sound in the space has been improved, and the intelligibility of speech in the meeting room has been increased.

KEYWORDS

Conservation of the historical space, Room acoustic design, Reverberation time, Speech intelligibility, Acoustic problems, Auditory comfort conditions.

INTRODUCTION

It is necessary to preserve the original forms of historical buildings and transfer them to future generations in a healthy way. In the interiors of historical buildings, the original interior forms should not be changed and the design decisions of the original period should be preserved. In addition, the requirements of current standards and current regulations should be considered in restoration processes as much as possible. The conservation philosophy and the requirements of current standards should be analysed together. In the restoration process of historical buildings, the analysis of the historical building according to current earthquake regulations, and interior requirements according to current standards should be considered important data in the preparation of restoration projects, and the integration of all disciplines should be ensured as much as possible in the preparation of restoration projects. While the restoration projects were being prepared, the requirements of all disciplines should be considered. However, satisfying current comfort conditions contrary to the conservation philosophy is a wrong solution proposal.

One of the important interior comfort conditions in historical buildings is auditory comfort conditions. Auditory problems caused by the large volume can often be observed in rooms with large indoor volumes. Especially, the problem of high reverberation time can be encountered in rooms with large internal volumes. Providing auditory comfort conditions in historical buildings should be carried out in accordance with the original design decisions of the historical building. Unfortunately, it can be observed that incorrect applications can be made in the interior design of historical buildings, the richness of the original interior can be reduced with the suggestion of suspended ceilings, the original windows can be closed and the design decisions of the original period can be damaged. Interior design decisions of historical buildings should be carried out in accordance with the design decisions of the original period and should be carried out without harming the conservation philosophy. With this perspective, interior

acoustic experts and restoration experts should work together and different disciplines should make decisions together. In restoration projects that need to be carried out with the integration of different disciplines, first of all, the original period features of the historical building should not be damaged. It should be aimed to improve the auditory comfort conditions without harming the original period design decisions. In this direction, it will be useful to examine the acoustic applications in the historical buildings made in the literature and to examine what the proposed improvement decisions are.

Acoustic improvement designs carried out without damaging the original feature of historical buildings is one of the important issues to be investigated. The acoustic properties of historical buildings and the improvement of acoustic conditions are frequently investigated in the literature. In the research of Iannace et al. (2013), a classroom located in a historical building was analysed, the original vault form was preserved in the acoustic improvement proposal, and the application of portable absorbent panels on the classroom wall was suggested. Alonso et al. (2014) researched the acoustic evaluation of the cathedral of Seville. they demonstrated that covering the cathedral columns with portable velvet draperies can be improved room acoustics. It is seen that covering the cathedral columns with portable velvet draperies in concert usage cannot give damage the original period design features. Prodi & Pompoli (2016) investigated acoustics in the restoration of Italian historical opera houses. They showed that glass wool strips can be hung along the lateral walls in a historical building to decrease reverberation time. It is seen that glass wool strips are movable and do not give damage to original hall volume. Bozkurt & Demirkale (2018, 2019, 2020a, 2020b) emphasized in their research that the original dome and vault forms in historical buildings should be preserved. They stated that the richness of the historical interior should be preserved and they mentioned that the interior volumes should not be reduced in this direction. To increase the acoustic comfort conditions in the interior and to prevent acoustic

problems, they investigated the improvement of the sound absorption coefficient of the plaster layers prepared with lime binder mortars in historical buildings. In the study of Bartalucci et al. (2018), the acoustic design of an auditorium in a church and of a historical theatre was researched. The authors stated that the variable acoustics of the church required to ensure optimal acoustic conditions in correspondence with the different uses is determined by the configuration of movable panels. It is observed that the variable panels do not harm the original design characteristic of the church. Iannace et al. (2019) investigated the church's acoustic condition which was built in the 1960s. The use of acoustic absorbing surfaces in accordance with the original structure of the church was suggested in the research. Berardi & Iannace (2020) investigated the acoustic of Roman theatres in Southern Italy, five different historical unroofed theatres were analysed, and they stated that the historical atmosphere makes the listener forget the acoustic limits of these theatres or the diffuse use of loudspeakers. For this reason, it has been seen that no design proposal has been presented that will negatively affect the original structure of historical theatres. Tronchin & Bevilacqua (2021) performed an acoustic analysis of the São Carlos national theatre building in Lisbon, and the acoustic conditions in the historical building were explained according to different usage scenarios. The effect of different types of stage systems on the reverberation time in the historical building was detailed. It is seen that different scenario studies have been carried out in a way that will not harm the large space perception of the historical building. Bozkurt (2022) performed an acoustic analysis of the main lecture hall on the Beyazıt campus of Istanbul University. It has been explained that the main lecture hall in the historical building was used for speaking purposes and that the volume of the hall was large. In the proposed acoustic improvement, the volume of the room was not reduced, the original windows were not closed, and the original period design decisions were preserved. In the proposed acoustic study, the absorbing surfaces have been increased and the acoustic quality of the space has been improved accordingly.

In the literature, it is observed that acoustic analysis of historical buildings is researched, and acoustic improvement suggestions can be presented in line with the characteristics of the historical building. However, it is seen that each historical building has its characteristics and acoustic improvement suggestions are presented in line with these features. It is understood that the proposed acoustic improvement proposals are not intended to damage the original period features of the historical building. However, acoustic improvement studies without damaging the original period characteristics of the historical building are a very broad subject to be investigated. It is necessary to increase the number of acoustic improvement research in historical buildings, which can be useful for acoustic experts and historical building conservation experts. Acoustic analysis studies in historical buildings can be informative for experts during the preparation of restoration projects. For this reason, in this study, the acoustic improvement project of a meeting room in a historical building was detailed.

HISTORICAL BUILDING AND MEETING ROOM

The building used by the Istanbul University Faculty of Science and Letters was designed by architects Sedat Hakkı Eldem and Emin Onat. The designed building was completed in 1952 (Günergun & Kadıoğlu, 2006). The building is located next to the Istanbul Beyazıt campus. The site plan (Fig.1a) and floor plan (Fig.1b) of the building used for the symposium held at Istanbul University in 1952 were given in Figure 1 (Günergun & Kadıoğlu, 2006). The building is registered as a cultural heritage by the IV Regional Board of Protection of Cultural Heritages. The Faculty of Science and Letters building has approximately 69200 m2 of closed area (Bozkurt et al., 2019).

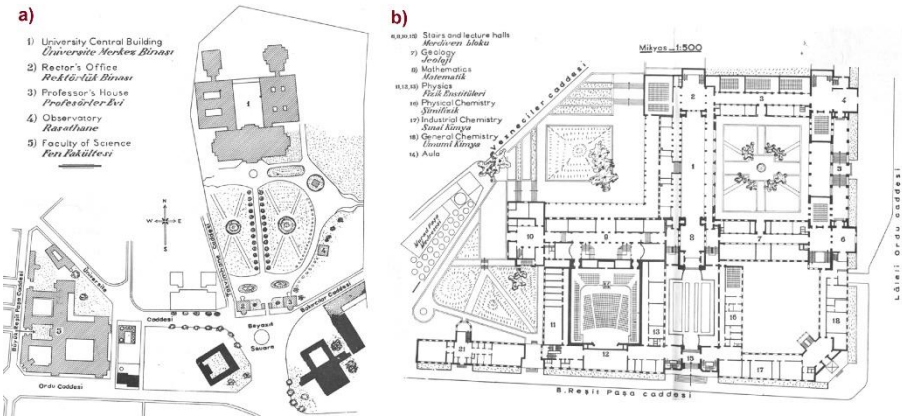


Figure 1. *The site plan and floor plan of the building used for the symposium held at Istanbul University in 1952, a) site plan, b) floor plan (Günergun & Kadıoğlu, 2006).*

The historical building, which reflects the eave forming of traditional Ottoman architecture, has a monumental appearance. Building sketches prepared by Sedat Hakkı Eldem reflecting the characteristics of traditional ottoman eaves are encountered in literature research (Fig.2).

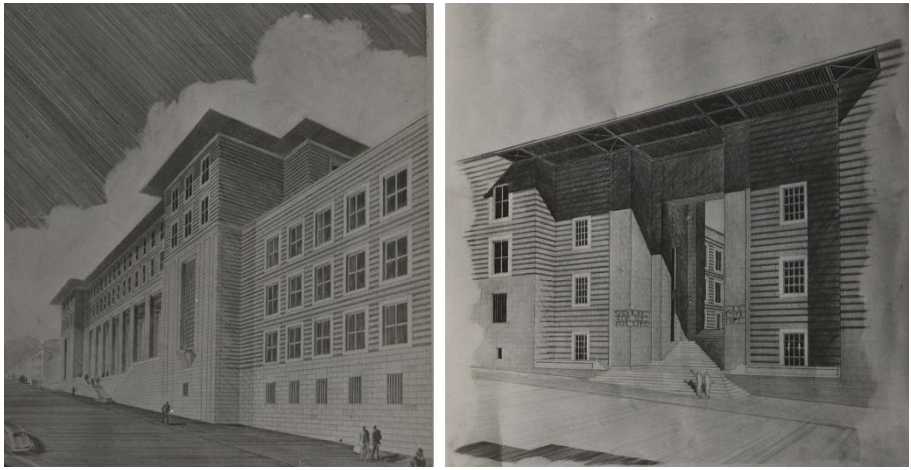


Figure 2. *Prepared building sketches in the early design process by Sedat Hakkı Eldem (URL-1).*

Figure 3. *Facade and indoor photographs of the building at the Faculty of Science and Letters of Istanbul University (Bozkurt et al., 2019).*

The building, designed by architect Sedat Hakkı Eldem, has rectangular and square courtyards surrounded by stone facades (Bozkurt et al. 2019). Inside the building, there are qualified corridors and rooms which have high ceiling heights and interior richness (Bozkurt et al., 2019). In addition, the vault form, which is frequently encountered in Ottoman architecture, can be seen in the interior of the building (Fig.3). It is understood that the building forms and design styles used in the history of Turkish architecture are especially emphasized in the building (Fig.3) (Bozkurt et al., 2019).

The meeting room, which is used by the Faculty of Science, was renovated according to the restoration project. The interior pictures of the meeting room belonging to the Faculty of Science before the renovation carried out in 2015 were presented in Figure 4. It is understood in Figure 4 that the

ceiling height of the meeting room is high and there is a mirror vault system on the ceiling.

Figure 4. *Meeting room photographs before the renovation carried out in 2015.*

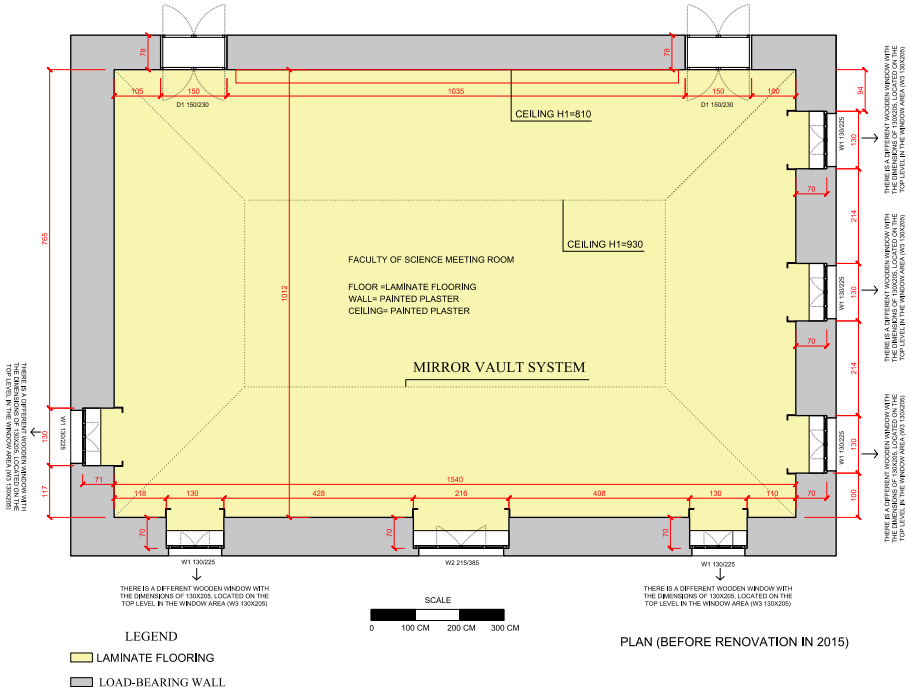


Figure 5. *Meeting room plan before the renovation carried out in 2015.*

The plan of the meeting room before the renovation is given in Figure 5., It is seen that the ceiling height is too high, and the floor height is 9.3 meters. Before the renovation, it was shown in Figure 5 that the floor covering was laminate flooring, and the ceiling and walls were painted plaster surfaces. It is understood from the drawing that the meeting room is approximately 156 m^2. It is observed that the volume of the room is approximately 1380 m^3. It is necessary to offer solutions to acoustic problems that may arise from the large volume of the meeting room. It is aimed to present an acoustic project proposal that will preserve the historical identity of the building and will not harm the perception of the mirror vault system, and it is detailed in the 4th section.

METHODOLOGY

The calculation of the reverberation time varies depending on the total volume and the total absorption in the room. If the total absorption in the room increases without changing the room volume, the reverberation time decreases. If the total absorption does not increase while the volume of the room increases, the reverberation time increases. In this direction, the problem of reverberation time is frequently observed in rooms having large volumes.

In the literature, it is observed that two different methods are frequently used in calculating the reverberation time. The most widely used reverberation time calculation method in the literature is the Sabine method. With the help of the Sabine method, it is understood that the sound absorption coefficient of the materials is obtained by the ISO 354 standard. It is stated in EN ISO 354 standard that "*The average reverberation time in the reverberation room is measured with and without the test specimen mounted. From these reverberation times, the equivalent sound absorption*

area of the test specimen, A_T, is calculated by using Sabine's equation". Many acoustic researchers can prefer to use the Sabine method during the reverberation time analysis since the sound absorption coefficient results measured in a reverberation room are obtained with the Sabine method. In the book prepared by Everest & Pohlman (2009), the authors stated that commonly available coefficients apply only to Sabine and for this reason, authors prefer to use the Sabine equation for some analyses. The second widely used reverberation time calculation method in the literature is the Eyring-Norris Equation method. Everest and Pohlman mentioned that the Eyring-Norris method can be used in more absorptive rooms and they defined that the other equations are generally equivalent to the Sabine equation during the average absorption coefficients of 0.25 or less. In the literature, it is seen that the Eyring-Norris method can be used in more absorbent spaces (such as small-volume rooms and studios). In this study, primarily the Sabin method was preferred to be used in the reverberation time analysis. However, in the acoustic improvement proposal, it was observed that the average absorbency of the room was quite high, and for this reason, it was decided to use the Eyring-Norris method separately in the reverberation time analysis. In this study, the reverberation time was analysed by using both the Sabine method and the Eyring-Norris method, and the properties of the wall surfaces were determined accordingly. The equation of the Sabine method for reverberation time analysis was given in Equation 1. (Long, 2006; Demirkale, 2007; Everest & Pohlmann, 2009).

$$\mathrm{RT_{sabine}} = 0.161\ \frac{\mathrm{V}}{\sum \mathrm{A}} \qquad (1)$$

RT_{sabine}= reverberation time of a room calculated with sabine method (sec.)
V= volume of room (m^3)
∑A= total absorption in the room (Eq. 2) (metric sabins). ∑A includes absorption provided by room boundaries, audience, furnishings, air, etc.

$$\sum \mathrm{A} = \left((\alpha_1 \,.S_1 + \alpha_2 \,.S_2 + \ldots + \alpha_n \,.S_n) + x.V\right) \qquad (2)$$

α_1, α_2, α_n= sound absorption coefficients (For different surface based on material properties)

S_1 , S_2 , S_n = respectively different room surfaces
x = air absorption coefficient

The reverberation time can be calculated using the Eyring-Norris method with the help of the Equation 3 (Everest & Pohlmann, 2009).

$$RT_{Eyring-Norris} = 0.161 \frac{V}{-S \ln(1-\alpha_{average})} \quad (3)$$

$RT_{Eyring-Norris}$ = reverberation time of a room calculated with Eyring-Norris method (sec.)
V= volume of room (m^3)
S = total surface area of room (m^2)
ln = natural logarithm (to base "e")
$\alpha_{average}$ = average absorption coefficient ($\Sigma S_i\alpha_i$ / ΣS_i)

Optimum values of indoor reverberation time vary according to the function of the room and the volume of the room. In the DIN 18041 standard, the determination of the required reverberation time according to the function types and indoor volume was clarified. In this research, the analysis of the reverberation time was made in accordance with the DIN 18041 standard, and the acoustic improvement proposal for the space was presented in this direction. In the DIN 18041 standard, it is stated that the optimum reverberation time for speech-purpose rooms can be obtained with the help of Equation 4 when there is a sound system in the room.

$$T_{TARGET} = [0,32 \times \log[V]-0,17] \text{ s} \quad (4)$$

V= room volume (m^3)

Since the volume of the meeting room is approximately 1380 m^3, the optimum reverberation time of the meeting room is equal to 0.835 (according to Equation 4). The required maximum and minimum reverberation time values, which vary according to the frequencies, can be obtained with the help of Figure 6. The required maximum and minimum reverberation time values are calculated according to the frequencies, considering the optimum reverberation time.

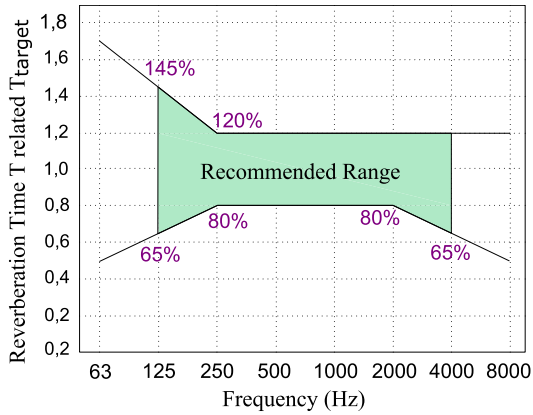


Figure 6. *Required reverberation time range according to the DIN 18041 standard (Nocke,2016; Bozkurt, 2022).*

According to octave band frequencies, the maximum and minimum reverberation time values required in the meeting room to provide auditory comfort conditions are given in Table 1. Table 1 was prepared using Figure 6 and was accepted as the limit level in this study. In the acoustic improvement proposal, limit levels have been determined in Table 1 to provide acoustic comfort conditions in line with the DIN 18041 standard. The reverberation analyses were carried out by not only the Sabin method and by the Eyring-Norris method.

Table 1. *The meeting room required reverberation time ranges (minimum and maximum values).*

Required reverberation time ranges	Frequency (Hz)					
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Maximum reverberation time	1.21	1.00	1.00	1.00	1.00	1.00
Minimum reverberation time	0.54	0.67	0.67	0.67	0.67	0.54

One of the important parameters in room acoustic is the prevention of delayed reflections. If there is a difference of 30 milliseconds between the reflected sound and the direct sound, it can cause delayed reflections

(Maekawa et al., 2011; Jaramillo, 2015). Initial time delay gap analyses were performed according to Equation 5.

$$ITDG = \frac{(R1+R2)-D}{0,344} \quad (5)$$

ITDG= Initial time delay gap (30 ≥ ITDG)
R1= Distance between source and reflective panel (meter)
R2= Distance between reflector panel and receiver (meter)
D= Direct distance between receiver and source (meter)

Reflected sound reaching the receivers after 30 milliseconds may damage the auditory comfort conditions. Delayed reflection analysis has been considered an important parameter in the determination of room surface properties. Surfaces that may cause delayed reflections are designed to be absorbent.

In speaking halls, the intelligibility of speech can be examined with AI (Articulation Index). This parameter takes into account the signal/background noise ratio as well as the reverberation time. In terms of speech intelligibility, the AI value was determined as very good between 1 and 0.7, and good between 0.5 and 0.7 (Mehta et al., 1999). A receiver point, which is the farthest point from the source, was selected in the AI calculation and AI calculation was performed in this direction. While performing the AI calculation, the sound pressure level at the receiver point is calculated according to the sound pressure level at the source. It is calculated separately according to the frequencies and the total signal level is taken into account, including the reflections at the receiver point. According to Equation 6, the sound pressure level difference between the source and the receiver is acquired. AI (Articulation Index) can be calculated by using Equation 7 (Mehta et al., 1999). The AI calculation process was detailed in the acoustic project proposal section.

$$SPL_2 = SPL_1 - 20\log\frac{D_2}{D_1} \quad (6)$$

SPL_2= Sound pressure level (source) (dB)
SPL_1= Sound pressure level (listener) (dB)
D_2= Distance from receiver (meter)
D_1= Distance of source (reference distance 1 meter)

$$AI = \text{Sum of ((S-N ratio) x weighting factor)} \quad (7)$$

AI= Articulation Index
S-N ratio = Signal Level -Noise Level (dB)

Acoustic problems in the space can prevent the homogeneous propagation of sound in the room. Among acoustic problems, concave surfaces can cause focusing. Since the ceiling structure of the historical place is vaulted, it may cause focusing problems. In this research, surfaces that may cause acoustic problems are designed to be absorbent, and acoustic problems have been tried to be reduced in this direction. In addition, flutter echo problems, echo problems, whispering galleries, and shadow areas can be defined as acoustic problems and these problems can damage the homogeneous propagation of the sound. After the acoustic project proposal is presented, the homogeneous propagation of the sound can be examined in acoustic simulation programs. In this study, a similar method was determined, and it was examined in detail whether the sound spread homogeneously in the proposed project using acoustic software. It can be seen that many different types of acoustic software are used in the literature. In this study, open-source I-SIMPA software was used as acoustic software. It is seen that the I-SIMPA software can be used in acoustic research prepared recently (Ribeiro et al., 2021; Pillai et al., 2022; Bozkurt, 2022). Acoustic model analysis prepared in the I-SIMPA software was presented in detail in the discussion section, and the homogeneous propagation of the sound was examined.

Reverberation time (RT) is defined as the time required for the sound to decrease by 60 dB after the source has stopped emitting. Also, similarly to

reverberation time analysis, EDT and T_{15} can be investigated in an acoustic simulation program instead of the reverberation time (RT). EDT is defined as six times the time it takes sound to decay by 10 dB after the source has stopped emitting. T_{15} is defined as four times the time after the source has stopped emitting. In the I-SIMPA software, EDT and T_{15} results were analysed in this study. The homogeneous propagation of the sound was examined over the EDT and T_{15} results in the acoustic software.

Clarity (C_{50}), which is an objective measure of the intelligibility of speech, is indicated in dB. C_{50} can be used to analyse late reflections which are unfavourable for understanding speech. Late reflections cause speech sounds to merge making speech unclear. However, if the delay does not exceed 50 ms (milliseconds) limit, the reflections can contribute positively to the intelligibility. In the C_{50} analyse, the ratio of the energy of the sound reaching the receiver before 50 ms to the sound energy reaching the receiver after 50 ms is considered. The formula for the C_{50} analysis was presented in Equation 8 (Laura et al., 2020). In addition, it can be observed that the Definition (D_{50}) analysis can be used as a similar analysis of the Clarity (C_{50}) term in the literature. D_{50} (Definition) is indicated in %. D_{50} (Definition) is the ratio between the energy arriving during the first 50 ms and the total energy. The formula for the D50 analysis was shown in Equation 9 (Patania et al., 2014). The homogeneous propagation of the sound in the meeting room was investigated in the I-SIMPA software, considering the D_{50} and C_{50} parameters.

$$C_{50} = 10 \log \left(\frac{\int_0^{50\ ms} p^2 t(dt)}{\int_{50\ ms}^{\infty} p^2 t(dt)} \right) \ dB \qquad (8)$$

C_{50} = Clarity term for the first 50 ms
p(t)= Sound pressure of the impulse response measured at the measurement point

$$D_{50} = \frac{\int_0^{50\ ms} p^2 t(dt)}{\int_{50\ ms}^{\infty} p^2 t(dt)} \quad \% \qquad (9)$$

D_{50} = Definition term for the first 50 ms
p(t)= Sound pressure of the impulse response measured at the measurement point

ACOUSTIC PROJECT PROPOSAL

In the restoration process of historical buildings, reducing the original room volumes and reducing the ceiling height by making suspended ceilings can damage the richness of the space. In this direction, it is not preferred to reduce the room volume by making suspended ceilings in historical buildings (Bozkurt & Demirkale, 2018). In particular, if there are high-quality handmade coatings on the ceiling or forms such as vaults or domes that reflect the original period feature, the suspended ceiling system should not be preferred. In the analysed room, closing the mirrored vault system on the ceiling by using the suspended ceiling may damage the richness of the meeting room. However, acoustic problems that may arise due to its high volume are also encountered as an important parameter. In this context, it is a more accurate way to find solutions to acoustic problems without reducing the volume of the room and without damaging the perception of the vault system.

During the preliminary design phase, the design proposal given in Figure 7 was examined for acoustic improvements. It is foreseen that the proposed study will improve the acoustic environment conditions, but it is clear that it will damage the identity of the historical building and the perception of the mirrored vault system in the room. It was suggested to use acoustic absorbing panels with a suspended ceiling system. However, it is very difficult to visually perceive the vault system on the ceiling. In addition, it was suggested that the two windows in the historical place should be closed completely. The perception of the windows on the upper level is difficult. Since the suspension systems on the ceiling are very dense, the perception of the high floor height of the room is damaged. In this direction, it was

decided to hang only artificial lighting with the suspension system and to reduce the acoustic panels in the ceiling system. The perception of the mirrored vault system, which was designed by Sedat Hakkı Eldem, was aimed to be preserved. For this reason, the proposed acoustic project in Figure 7 was not applied.

Figure 7. *Meeting room project suggestion which is not applied (Istanbul University Construction and Technical Department, meeting room design suggestion, 2014).*

The photos after the renovation of the meeting room are presented in Figure 8. In the photographs of 2015, it is seen that the original windows were not closed. In addition, it is observed that the perception of the vault was not impaired and the suspension systems were not used densely. Only artificial lighting systems were applied by hanging. According to the request of the Faculty of Science, the carpet covering, which can be easily installed and dismantled, has been made on the floor surface. The original floor height has been preserved. In addition, the windows on the upper levels are easily perceived and the windows on the upper levels contribute to natural lighting. The visual perception of the vault system, which is frequently observed in the history of Turkish architecture, has been conserved, and the design decisions made in its original period have been preserved accordingly. The ceiling system given in Figure 7 was not applied and accordingly, the design decisions of Sedat Hakkı Eldem, the architect of the building, were

respected. In brief, the perception of the original vault form has been preserved and the inner richness of the space has been preserved.

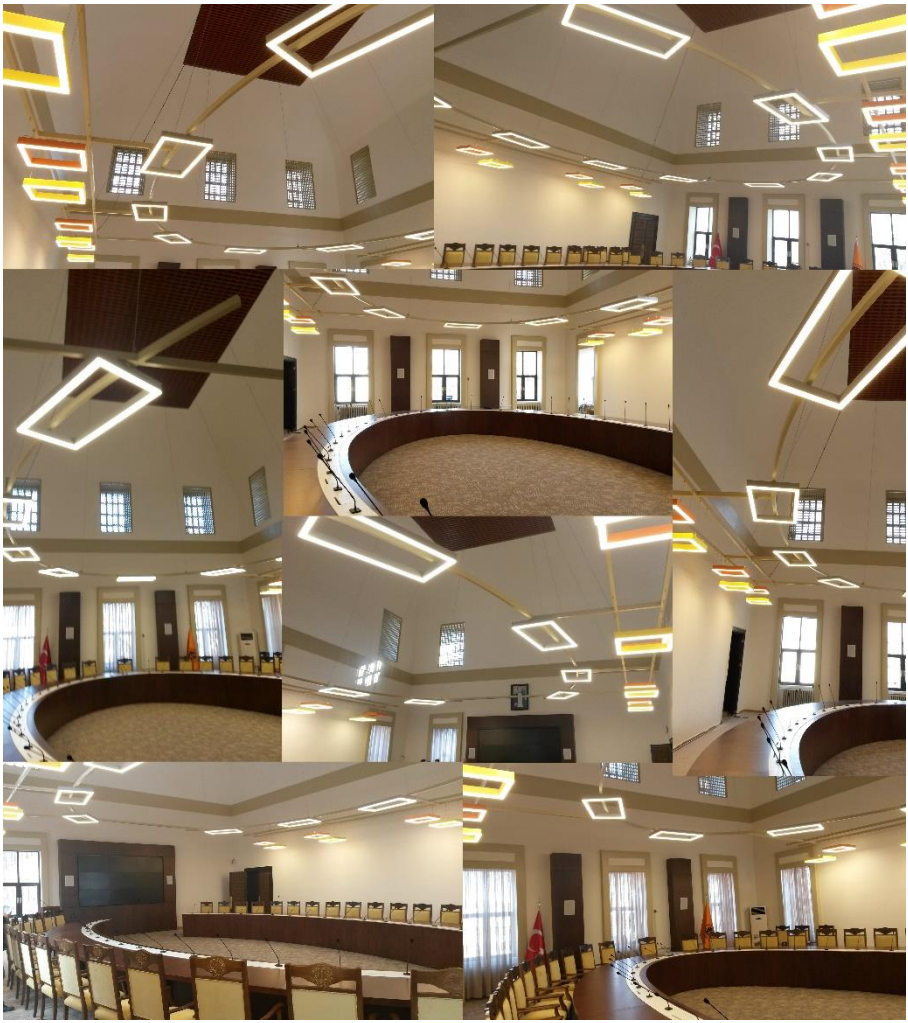


Figure 8. *Meeting room after renovation (Photos from 2015).*

It is observed that the renovation work carried out in line with the budget has improved the acoustic comfort conditions by using carpet covering. However, the absorbency of the room is still not at a sufficient level. The

total absorption value calculated according to Equation 2 in the meeting room was presented in Table 2.

Table 2. *Total absorption results of the meeting room after renovation.*

PROPERTIES OF SURFACES		FREQUENCY (Hz)											
		125 Hz		250 Hz		500 Hz		1000 Hz		2000 Hz		4000 Hz	
SURFACE TYPE	Area (m^2)	α	S. α	α	S. α	α	S. α	α	S. α	α	S. α	α	S. α
Carpet	155.85	0.02	3.12	0.06	9.35	0.14	21.82	0.37	57.66	0.60	93,51	0.65	101.30
Solid wooden door	6.90	0.14	0.97	0.10	0.69	0.06	0.41	0.08	0.55	0.10	0,69	0.10	0.69
Curtain	48.84	0.04	1.95	0.16	7.81	0.19	9.28	0.17	8.30	0.20	9,77	0.25	12.21
Painted plaster surface	515.28	0.02	10.31	0.02	10.31	0.02	10.31	0.02	10.31	0.02	10,31	0.02	10.31
Air (not surface, volume-m^3)	1380.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	13,80	0.02	27.61
Total absorption, ∑A			16.34		28.16		41.82		76.82		128.08		152.12

In line with the total absorption results given in Table 2, Equation 1 was used to calculate the reverberation time based on the Sabin method. Similarly, the reverberation time was calculated according to the Eyring-Norris method by using Equation 3 in line with the total absorption values given in Table 2. The results of the reverberation time calculations were presented in Table 3.

Table 3. *Reverberation time calculation results of the meeting room after renovation (without acoustic project suggestion).*

Reverberation time calculation results	Frequency (Hz)					
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Sabine method	13.60	7.89	5.31	2.89	1.74	1.46
Eyring-Norris method	13.45	7.74	5.16	2.74	1.58	1.30
Required maximum value	1.21	1.00	1.00	1.00	1.00	1.00
Required minimum value	0.54	0.67	0.67	0.67	0.67	0.54

Although the carpeting could improve the reverberation time at high frequencies, it did not greatly increase the overall absorption level of the low frequencies. The reverberation time values calculated by the Sabin method and the Eyring-Norris method did not meet the requirements of the DIN 18041 standard. It was understood that the reverberation time calculation results are much higher than the required levels.

In the literature, it was stated that delayed reflections of 30 milliseconds from reflective surfaces can affect auditory comfort conditions negatively (Demirkale, 2007; Makeawa et al., 2011; Jaramillo & Stell, 2015). Reflection analyses were examined according to the flat surface of the mirrored vault system in the historical building. The ceiling reflections of three different receiver points were investigated, and the positions of three different receiver points were shown in Figure 9. It was calculated whether there is a delayed reflection at three different receiver points (Eq.5). The reflection results of three different receiver points, calculated according to Equation 5, were presented in Table 4. It was determined that there is a delayed reflection caused by the ceiling height at the first receiver point. According to the results of Table 4, it can be understood that delayed reflection problems may occur at many receiver points.

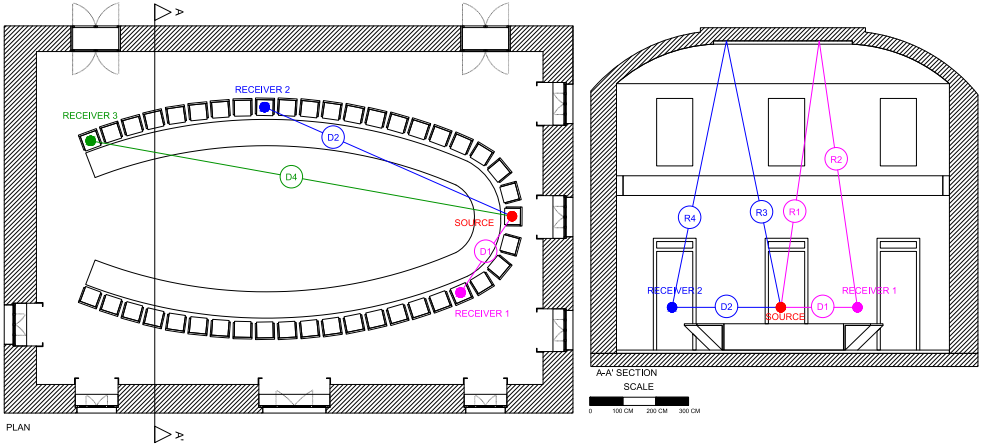


Figure 9. *Analysis of reflections (initial time delay gap).*

Table 4. *Analysis of reflections (initial time delay gap).*

RECEIVER	EQUATION	CALCULATION RESULTS
Receiver 1	$\frac{(R1+R2)-D1}{0{,}344} \leq 30\ ms$	$\frac{(8.22+8.22)-2.8}{0.344} = 39.65 \qquad 39.65 \nleq 30\ ms$

Receiver 2	$\frac{(R3+R4)-D2}{0{,}344} \leq 30\ ms$	$\frac{(9.08+9.08)-8.23}{0.344} = 28.87 \quad 28.87 \leq 30\ ms$
Receiver 3	$\frac{(R5+R6)-D3}{0{,}344} \leq 30\ ms$	$\frac{(10.39+10.39)-13.01}{0.344} = 22.58 \quad 22.58 \leq 30\ ms$

Due to the high ceiling height, delayed reflections can be observed in the meeting hall. It has been determined that the delayed reflection problems caused by the ceiling height negatively affect the acoustic comfort conditions. However, reducing the ceiling height with the suggestion of a suspended ceiling will also harm the richness of the space. For this reason, in this research proposal, the ceiling height was not changed and the decisions of the original design period were preserved. It has been suggested that ceiling surfaces be designed as absorbers to reduce delayed reflection problems. In addition, vault ceiling systems can cause the focusing problem in room acoustic. Designing such concave surfaces having a sound-absorbing character reduces the focusing problem in room acoustic. Hence, the sound-absorbing feature of the surface of the vault system is beneficial for improving acoustic comfort conditions. For the stated reasons, it was recommended to cover the surfaces of the vault with materials with a high sound absorption coefficient.

To adjust the required reverberation time, it is necessary to increase the total absorption in the meeting room (Metha et al., 1999; Jaramillo & Stell, 2015). In Figure 10, the positions of the surface coatings in the acoustic project were shown in the plan and section. In the floor covering of the hall used by the science faculty, the carpet was requested to be used in line with the faculty's request, and the reverberation time was improved. However, it is observed that the floor coverings of the historical building are generally terrazzo. It is also difficult to clean the carpet covering. Since a comprehensive acoustic project has been prepared and the sound

absorption coefficient of all frequencies has been reconsidered, the replacement of the floor covering has been suggested in the acoustic project (Fig.10).

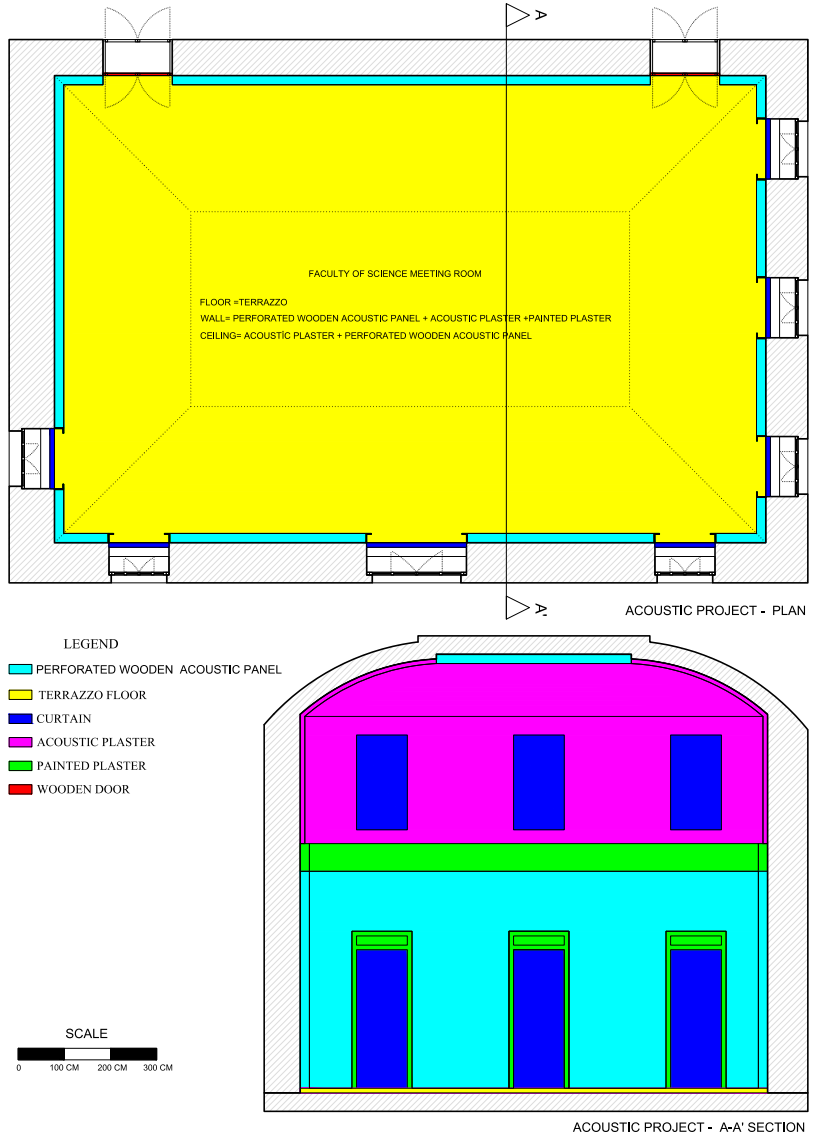


Figure 10. *Meeting room acoustic project proposal.*

The perception of the vault form was not intended to be changed in the acoustic project. For this reason, acoustic plaster coating was recommended for the upper elevations. The perforated acoustic wood cladding was proposed only on the flat surface of the mirrored vault system (Fig.10). In the photographs given in Figure 4 and Figure 8, wooden material was used in the flat part of the mirrored vault and the perception of the vault system was emphasized. The same design idea was continued in the acoustic project proposal (Fig.10).

It was suggested to use curtains in front of the windows in the acoustic project. In addition, the molding on the upper level of the room and the window moldings, shown in Figure 8, has been preserved in the acoustic project. It was suggested to paint the room and window moldings. It was suggested to paint the room and window molding coverings (Fig.10). It was recommended to use a perforated wooden acoustic panel coating in the area between the floor covering and the upper-level room molding. It was suggested that wooden acoustic panel coatings should be a removable system (Fig.10). In addition, it was recommended to assemble it in a way that will not damage the historical building. The materials used in the reverberation time calculation and the references from which the sound absorption coefficients were obtained were detailed in Table 5.

Table 5. *Properties of the surfaces.*

TYPE AND PROPERTIES OF COVERING	REFERENCE
Acoustic panel with aligned holes, (Pitch(mm): 32x32, Hole diameter(mm): Ø8, Perforated area: 4.9%, panel thickness:16 mm, plenum 200mm, 40 mm thick rock wool with 30 kg/m^3 density in the cavity)	Decustik company catalog, URL-2
Terrazzo	Cox& D'Antonio ,2004
Carpet	Cox& D'Antonio ,2004
Curtain (Hung straight)	Cox& D'Antonio ,2004
Painted plaster surface	Cox& D'Antonio ,2004
Acoustic plaster	Cox& D'Antonio ,2004
Solid wooden door	Cox& D'Antonio ,2004

In line with the acoustic project proposal, the total absorption results of the meeting hall were calculated with the help of Equation 2, and the total absorption results according to the octave band frequencies were given in Table 6. According to the calculated total absorption results given in Table 6, reverberation time was calculated according to the Sabine method using Equation 1, and reverberation time was calculated according to the Eyring-Norris method using Equation 3. The reverberation time calculation results of the new acoustic project proposal calculated separately according to the Sabin method and the Eyring method were presented in Table 7.

Table 6. *Total absorption results of the meeting room (according to the acoustic project suggestion).*

PROPERTIES OF SURFACES		FREQUENCY (Hz)											
		125 Hz		250 Hz		500 Hz		1000 Hz		2000 Hz		4000 Hz	
SURFACE TYPE	Area (m^2)	α	S. α	α	S. α	α	S. α	α	S. α	α	S. α	α	S. α
Terrazzo	155.85	0.01	1.56	0.01	1.56	0.015	2.34	0.02	3.12	0.02	3.12	0.02	3.12
Solid wooden door	6.90	0.14	0.97	0.10	0.69	0.06	0.41	0.08	0.55	0.10	0.69	0.10	0.69
Curtain	48.84	0.04	1.95	0.16	7.81	0.19	9.28	0.17	8.30	0.20	9.77	0.25	12.21
Painted plaster surface	40.32	0.02	0.81	0.02	0.81	0.02	0.81	0.02	0.81	0.02	0.81	0.02	0.81
Acoustic panel with aligned holes	230.00	0.75	172.50	0.55	126.50	0.44	101.20	0.36	82.80	0.19	43.70	0.08	18.40
Acoustic plaster	242.75	0.30	72.83	0.35	84.96	0.50	121.38	0.70	169.93	0.70	169.93	0.70	169.93
Air (not surface, volume-m^3)	1380.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	13.80	0.02	27.61
Total absorption, ∑A			250.61		222.33		235.41		265.50		241.81		232.76

Table 7. *Reverberation time calculation results of the meeting room after renovation (according to acoustic project suggestion).*

Reverberation time calculation results	Frequency (Hz)					
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Sabine method	0.89	1.00	0.94	0.84	0.92	0.95
Eyring-Norris method	0.72	0.84	0.78	0.67	0.76	0.79
Required maximum value	1.21	1.00	1.00	1.00	1.00	1.00
Required minimum value	0.54	0.67	0.67	0.67	0.67	0.54

It is understood in Table 7 that the reverberation time results calculated by both the Sabin method and the Eyring-Norris method are in accordance with the range defined in the DIN 18041 standard. The total absorption rate of the meeting room has been increased with the proposed new acoustic project, and the auditory comfort conditions have been improved

accordingly. It has been seen that the results of the reverberation time calculation are in accordance with the requirements of the DIN 18041 standard.

In the analysis of speech intelligibility, there are different parameters besides reverberation time. One of the important parameters in evaluating speech intelligibility is the Articulation Index (AI). The distance value between the source and the receiver is effective in the AI (Articulation Index) calculation. The higher the sound energy that reaches the receiver from the sources, the higher the AI value. In the AI calculation, the background noise level of the room is effective in the calculation. In addition, the value of the reverberation time of the space is also considered in the AI calculation. An AI value between 1 and 0.7 means that the speech intelligibility level is very good in the room. Also, it was stated that speech intelligibility was good when the AI value was between 0.7 and 0.5 (Metha et al., 1999). In this study, the listener at the farthest point from the speaker was analysed (It will be sufficient for the receiver point with the least AI level to meet the required level). For this reason, the AI value of the Receiver 3 point shown in Figure 9 has been calculated. While calculating the AI value, the sound pressure level of the direct sound reaching the listener was considered. Reflections were not taken into account in the AI calculation, since the total absorption level is high in the proposed acoustic improvement study and only the floor covering has a reflective character. The values of the sound pressure level 1 meter away from the speaker were given in Table 8 according to the changing frequencies (Metha et al., 1999). The sound pressure level of direct sound calculated according to Equation 6 was shown in Table 8 according to frequencies (Mehta et al.,1999). The interior noise level of the meeting hall was defined according to the NC30 noise curve which can be accepted as the maximum interior noise level of the meeting hall function. Moreover, WF (weighting factor) was acquired from the book prepared by Mehta et al.

(1999) and was shown according to the frequency in Table 8. The result of the AI value calculated in accordance with Equation 7 was given in Table 8.

Table 8. *Articulation Index calculation at the receiver 3 which is the farthest point from the source (Receiver 3 was shown in Figure 9).*

Frequency (Hz)	SPL at 1m (dB)	Signal Level (dB)	Noise Level (NC 30)	S-N ratio	WF (weighting factor)	(S-N) x WF
250	72.5	50.2	41	9.2	0.0024	0.0221
500	74	51.7	35	16.7	0.0048	0.0802
1000	68	45.7	31	14.7	0.0074	0.1088
2000	62	39.7	29	10.7	0.0109	0.1167
4000	57	34.7	28	6.7	0.0078	0.0523
AI = 0.0221 + 0.0802 + 0.1088 + 0.1167 + 0.0523 = **0.38**						

The calculated AI value is analysed separately in indoor areas. Correction should be performed in the reverberant room. The level that should be subtracted from the AI value was defined in the book of Metha et al. (1999) according to the calculated reverberation time values. In the book, it is recommended to decrease approximately the 0.7 value from the AI result when the reverberation time is approximately 0.7 seconds. The calculated AI value was 0.31 after the reverberation time correction was done. It was determined that if the listeners see the speaker, the calculated AI value and the effective AI value can be different, and it was clarified that the effective value was higher in this case (Mehta et al., 1999). While the calculated AI value is approximately 0.31, the effective AI value is approximately 0.50 (Mehta et al.,1999).

It was seen that the calculated AI value was between 0.5 and 0.7. This range can be defined as good according to Metha et al. (1999). Since the effect of reflections was ignored in this calculation, the AI value is expected to be higher in the real situation. In addition, the calculations are calculated for the human voice speaking without shouting. There is a loudspeaker system in the meeting room and the speaker's voice can be increased with the help of the electroacoustic system. In this case, it is clear that the AI value will be much higher.

DISCUSSION

Within the scope of the study, an acoustic project proposal was presented to improve auditory comfort conditions and it was aimed to control the reverberation time in line with the DIN 18041 standard. The calculation results of the reverberation time and the required reverberation time values (maximum and minimum) were shown in Figure 11. Moreover, the reverberation time calculation results without the acoustic project proposal and the reverberation time calculation results with the acoustic project proposal were compared in Figure 11.

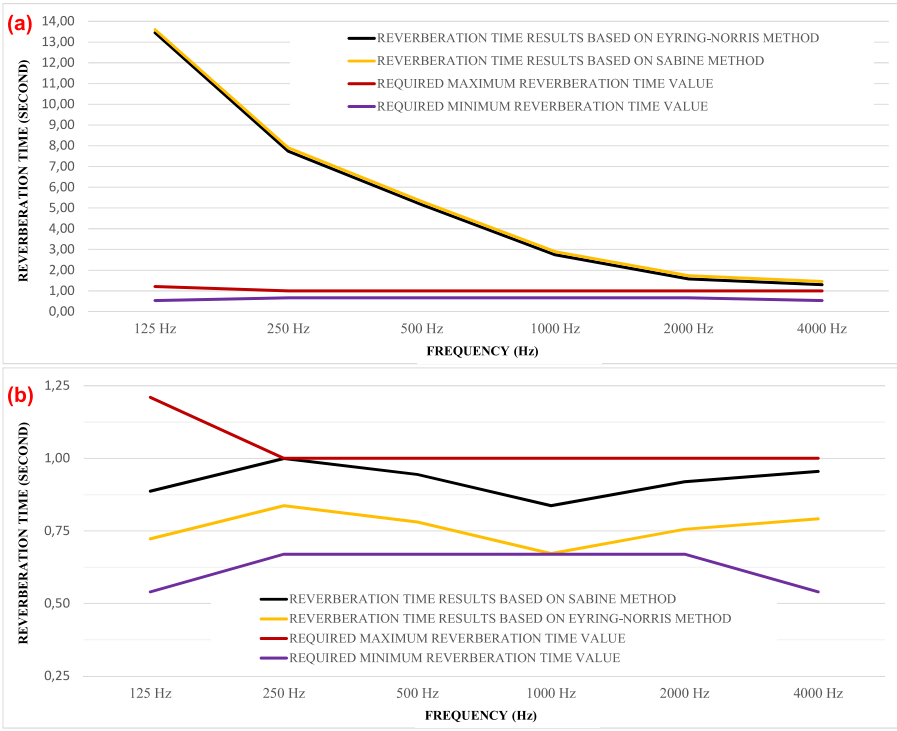


***Figure 11**. Reverberation time results of the meeting room a) without acoustic project suggestion, b) with acoustic project suggestion.*

In Figure 11a, it can be seen that the reverberation time results are very high compared to the required range. It was observed that the reverberation time should be controlled to increase the auditory comfort conditions. The reverberation time results of the proposed acoustic project were shown in Figure 11b. Reverberation time values were improved by increasing the total absorbency in the room. Reverberation time results calculated according to both the Sabine method and Eyring-Norris method meet the required values. It has been determined that the reverberation time results calculated in line with the acoustic project are in accordance with the reverberation time intervals specified in the DIN 18041 standard (Fig.11b). In addition, designing the vault ceiling surfaces with sound-absorbing characteristics was

suggested in the acoustic project study. In this way, it was aimed to reduce the focusing problem, which can often be observed on concave surfaces. In addition, the reduction of delayed reflections caused by ceiling reflections was intended with the acoustic project proposal. The auditory comfort conditions of the meeting room were improved with an acoustic project proposal.

Everest & Pohlmann (2009) stated that if the average absorption level in the room is below 0.25, the results of the Sabin method reverberation time calculation will be close to the Eyring-Norris method reverberation time calculation. A similar situation can be seen in Figure 11a. In the acoustic improvement project proposal, the total absorption ratio in the room was increased and the average absorption value exceeded 0.25. For this reason, the reverberation time calculation results of the Sabin method and the Eyring-Norris method can be different in Figure 11b.

It has been determined that the AI (Articulation Index) value is suitable for all listener points as a result of the analyses made. However, it could not be recommended to reduce the plan size of the room by dividing it with a partition wall, even if the AI value was calculated as insufficient. It would be advisable to reduce the number of listeners simply by reducing the table size. It is essential to preserve the original room forms in the restoration of historical buildings.

In literature research, it is seen that acoustic suggestions are presented in accordance with the original form of historical buildings. Iannace et al. (2013) examined the vaulted classroom and offered practical suggestions. They could not present the concave vault surfaces as absorbent. However, in this study, there was no budget constraint as there was no field measurement and there was no obligation to implement the proposed project. Hence, the vault surfaces are designed as absorbent. Alonso et al. (2014) investigated

the cathedral in Seville and they suggested covering the cathedral columns with portable velvet draperies to improve acoustic comfort conditions. However, the visual perception of the original stone columns was changed. In the acoustic project proposal, the original period perception of the vault form was preserved with the acoustic plaster proposal. It is predicted that the visual perception of the vault surfaces does not change significantly in this acoustic project suggestion. Prodi & Pompoli (2016) and Bartalucci et al. (2018) analysed the improvement of the room acoustic using portable surfaces. Similarly, in the proposed acoustic project study, it has been suggested to use removable acoustic absorbers on the lower surfaces of the wall coverings.

Homogeneous propagation of sound is targeted in indoor acoustic designs. In interior design, if the sound spreads homogeneously, the occurrence of interior acoustic problems is prevented. Homogeneous propagation of sound can be examined in acoustic simulation programs. The reverberation time values calculated in the 4th section provide information about the average approximate levels for the meeting room. However, the reverberation time results, which vary according to the receiver points in the space, can be obtained with the help of acoustic simulation programs. For this reason, the reverberation time in acoustic research was also examined in the I-SIMPA acoustic software. Version 1.3.4 of the I-SIMPA software was used, the meeting room was modelled in a 3D model, and the 3D model was transferred to the I-SIMPA software. The coating properties of the surfaces were defined in line with the acoustic project after the 3D model was transferred to the I-SIMPA software. The images of the model obtained from the I-SIMPA software were given in Figure 12.

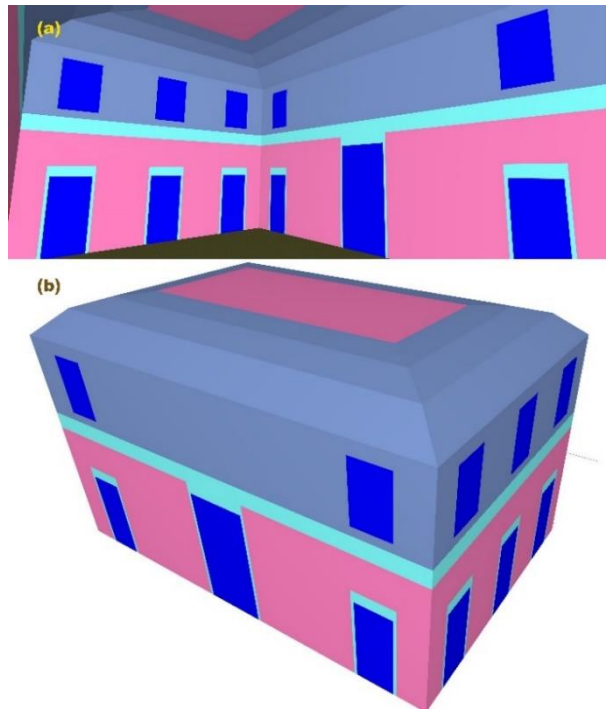


Figure 12. *The meeting room model in the I-SIMPA software, a) Interior image of the room, b) exterior image of the room.*

The location of the speakers used in the meeting room is shown in Figure 8. The location of the loudspeakers was approximately entered into the simulation program and 4 different loudspeakers were defined as sources during the analysis process. Analyses were carried out with the loudspeakers 3 meters above the ground. The loudspeakers are defined as omnidirectional in the acoustic software to analyse the reflections of the loudspeakers on all wall surfaces. Receivers were defined as a plane, and the plane receiver grid system was located 1.6 meters above the floor. Grid solution was defined as 30 cm x 30 cm in a plane receiver grid system. The acoustic analysis was performed by choosing the SPSS calculation method in I-SIMPA software.

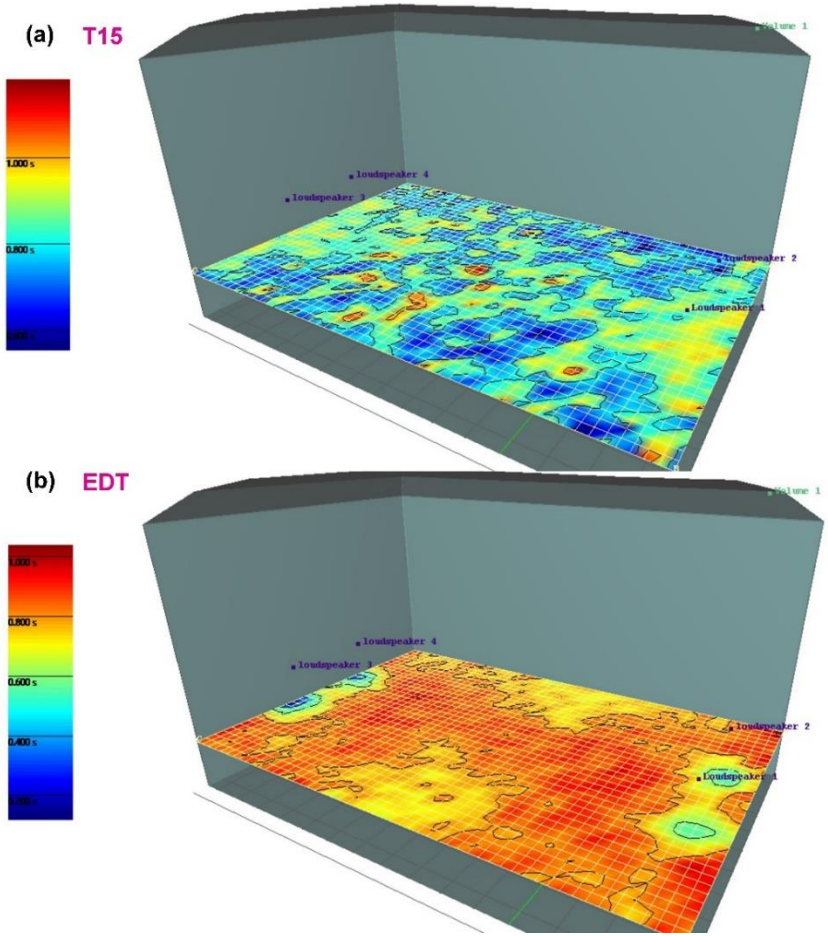


Figure 13. *Acoustic software results at 500 Hz, a) T15, b) EDT.*

The simulation program calculation results at 500 Hz related to the reverberation time were given in Figure 13. It is seen that the T15 results and the results of the reverberation time calculated in the 4th section approximately overlap with each other (Fig.13a). Likewise, The EDT simulation results at 500 Hz and the calculated reverberation time results at

500 Hz (calculated in the 4th section) are approximately similar at the receiver points (Fig.13b). In general, it is observed that the results of the reverberation time in the grid system are close to each other. It slightly differs the reverberation time values of 4 different points where only the loudspeakers are located. It can affect the homogeneous spread of the loudspeakers. Apart from this situation, no significant differentiation was observed in the grid system in the results of the reverberation time. For this reason, it can be said that the sound spreads homogeneously in the meeting room at 500 Hz in general. It has been found that surface coatings can reduce acoustic problems in general.

It is possible to analyse the delayed reflections on the results of the simulation program. An acoustic project was proposed so that the ceiling surfaces would be absorbent, delayed reflections were improved, and these issues were detailed in the 4th chapter. In this section, the results of the simulation program are examined over the parameters clarity (C_{50}) and definition (D_{50}), and the results of the C_{50} and D_{50} at 500 Hz were given in Figure 14. Llorca et al. (2018) suggested that the clarity (C50) value should be above 1 dB in the halls used for speech purposes. It was seen in Fig 14a that the C_{50} results are above the value of 1 dB in general, and it was observed that most of the sound energy reaches the receivers before 50 milliseconds. In the D_{50} analysis, it was understood in Figure 14b that more than 50% of the sound energy generally reaches the receivers before 50 milliseconds. In the C_{50} and D_{50} analyses, it was determined that the delayed reflections occurred less. It has been noticed that absorbent surface recommendations reduce delayed reflections.

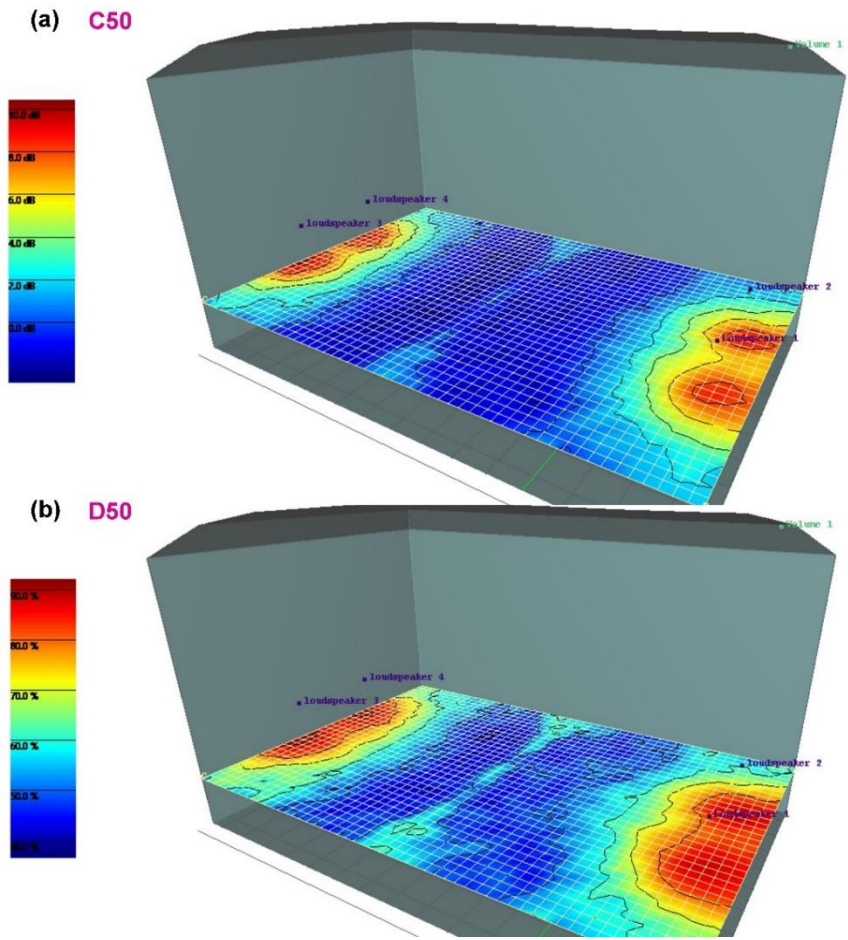


Figure 14. *Acoustic software results at 500 Hz, a) C50, b) D50.*

In this study, field measurements could not be made because there was no calibrated sound measurement system and sufficient budget could not be found. In the literature, it can be observed that firstly the field measurements are made for the existing hall, then the acoustic model analysed in acoustic software is calibrated in line with the field measurements, and finally, the acoustic simulation results are examined by

acoustic improvement suggestions. The lack of field measurements can be considered the biggest weak point of this research.

The proposed acoustic project does not harm the perception of the large volume of the historical place. In the acoustic project, the original design decisions were conserved, the ceiling height was not reduced by the suspended ceiling proposal and the perception of the vault in the interior was preserved. The sound absorption performance of the surfaces was improved. Accordingly, the total absorption in the room has been increased. In summary, with the proposed acoustic project, the original period decisions of the historical building were preserved and the interior acoustic comfort conditions were improved at the same time. The research provides information about the acoustic project preparation process in the restoration of historical buildings. In historical building restorations, this study may be useful to define appropriate intervention decisions for the improvement of acoustic comfort conditions.

CONCLUSION

In the restoration of historical buildings, the design decisions made in the original period should be preserved. In addition, restoration decisions should be made in accordance with user comfort conditions. In this research, the meeting room of a historical building was examined and acoustic design suggestions were presented in accordance with its historical structure. It has been aimed to improve the auditory comfort conditions without harming the design decisions of the original period of the historical space. In this direction, an acoustic project proposal has been presented. In the acoustic project suggestion, the design decisions of the original period were preserved, the ceiling height was not changed, and the richness of the interior and the vault form, which was the characteristic of the original period, were preserved.

In the acoustic project proposal, the total absorbance of the room has been increased and the auditory comfort conditions have been improved accordingly. Within the scope of the research, reverberation time, delayed reflections, and articulation index were examined in detail. Acoustic improvement decisions were presented in line with all parameters in the acoustic project proposal. In addition, the meeting room was analysed with the help of an acoustic simulation program and the homogeneous propagation of the sound was investigated in detail. The results of the T_{15} parameter, EDT parameter, C_{50} parameter, and D_{50} parameter obtained in the acoustic simulation program were analysed and compared with the calculated results. In addition, according to the results of the acoustic simulation program, it was questioned whether the sound spreads homogeneously or not. As a result, it has been determined that the reverberation time has been improved in line with the DIN 18041 standard with the acoustic project proposal. It has been ensured that the results of the reverberation time calculated in line with the acoustic project proposal are compatible with the DIN 18041 standard. It has been understood that delayed reflections are largely prevented. It has been understood that the sound can generally spread homogeneously. Due to the homogeneous spread of the sound, acoustic problems in the space were reduced (focusing, whispering gallery, etc...). In summary, with the proposed acoustic project, indoor auditory comfort conditions have been increased.

Restoration of each historical building should be carried out in accordance with its own unique design decisions. For this reason, acoustic improvement designs should differ depending on the character of the historical building. With this point of view, acoustic improvement project works of historical buildings may differ in each historical building. For this reason, acoustic improvement project studies are a very broad research topic in the literature.

It is anticipated that this research can be beneficial to inform the experts working on restoration issues. In addition, it is estimated that the prepared study can give an idea to academic studies.

ACKNOWLEDGMENTS

The author would like to thank the Department of Construction and Technical Affairs, Istanbul University Rectorate.

REFERENCES

Alonso, A., Sendra, J.J., Suárez, & R., Zamarreño, T. (2014). Acoustic evaluation of the cathedral of Seville as a concert hall and proposals for improving the acoustic quality perceived by listeners. *Journal of Building Performance Simulation*, 7(5), 360–378. DOI: 10.1080/19401493.2013.848937

Bartalucci, C., Borchi, F., Carfagni, M., Luzzi, S., & Busa, L. (2018, June). The Acoustic Design and Requalification of an Auditorium in a Church and of a Historical Theater. In *IOP Conference Series: Materials Science and Engineering* (Vol. 364, No. 1, p. 012091). IOP Publishing. DOI:10.1088/1757-899X/364/1/012091

Berardi, U., & Iannace G. (2020). The acoustic of Roman theatres in Southern Italy and some reflections for their modern uses. *Applied Acoustics*, 170, 107530. DOI: 10.1016/j.apacoust.2020.107530

Bozkurt T.S. (2022). Acoustic Improvement Proposal in Historical Building: The Example of The Main Lecture Hall at The Beyazıt Campus of Istanbul University. *Gazi University Journal of Science Part B: Art Humanities Design and Planning, 10*(1), 13-29. https://dergipark.org.tr/tr/pub/gujsb/issue/69238/1075978

Bozkurt, T.S., & Demirkale, S.Y. (2019). Laboratory analyses and numerical simulation for sound absorption of plasters in historical buildings. *Journal of Cultural Heritage*, 36, 103-117. DOI: 10.1016/j.culher.2018.09.012

Bozkurt, T.S, & Demirkale, S.Y. (2018). The laboratory analyses for the plasters prepared with river sand aggregate and hydraulic lime binder. *Construction and Building Materials*, 190, 691–709. DOI: 10.1016/j.conbuildmat.2018.09.073

Bozkurt, T.S, & Demirkale, S.Y. (2020a). Investigation and development of sound absorption of plasters prepared with pumice aggregate and natural hydraulic lime binder. *Applied Acoustics*, 170, 107521, DOI: 10.1016/j.apacoust.2020.107521

Bozkurt, T.S., & Demirkale, S.Y. (2020b). The experimental research of sound absorption in plasters produced with perlite aggregate and natural hydraulic lime binder. *Acoust Aust*, 48, 375–393, DOI: 10.1007/s40857-020-00203-4

Bozkurt T. S., Sayın B., Karakas A. S., & Akcay C. (2019). Retrofitting of Modern Heritage Masonary Infilled RC Buildings. *5th International Conference on Engineering and Natural Sciences*, ICENS, June 12-16 2019, Prague, Czech Republic, Book of proceedings 2019, pp. 645-653. ISBN 978-605-81426-1-9, https://www.icens.eu/sites/default/files/2019_icens_proceedings_v5.pdf

Cox, T., & D'Antonio, J.P. (2004). *Acoustic Absorbers and Diffusers: Theory Design and Application*. Spon Press; Taylor and Francis, ISBN 0-203-49299-4

Demirkale, S.Y. (2007). *Çevre ve Yapı Akustiği*. Birsen yayınevi, ISBN: 978-975-511-472-9

DIN Standard (2016). *Acoustic Quality in Rooms – Specification and Instructions for the Room Acoustic Design*, DIN 18041:2016. Berlin: Germany.

Everest, F., & A. Pohlmann, K., C. (2009). *Master Handbook of Acoustics*. McGraw-Hill, ISBN: 978-0-07-160333-1

Günergun, F., Kadıoğlu S. (2006). İstanbul Üniversitesi'nin Yerleşim Tarihçesi Üzerine Notlar. *Osmanlı Bilimi Araştırmaları*, 8(1), 135-160, https://dergipark.org.tr/tr/download/article-file/13256

Iannace, G., Berardi, U., De Rossi, F., Mazza, S., Trematerra, A., & Ciaburro, G. (2019). Acoustic Enhancement of a Modern Church. Buildings, 9(4), 83, DOI: 10.3390/buildings9040083

Iannace, G., Trematerra, A., & Trematerra, P. (2013). Acoustic correction using green material in classrooms located in historical buildings. *Acoustics Australia*, 41(3), 213-218.

ISO 354 (2003). *Acoustics —Measurement of sound absorption in a reverberation room.* ISO 354:2003.

Jaramillo, A. M., & Stell, C. (2015). *Architectural Acoustics*. Taylor & Francis Group, ISBN: 978-1-315-75284-6

Labia, L., Shtrepi, L., & Astolfi, A. (2020). Improved Room Acoustics Quality in Meeting Rooms: Investigation on the Optimal Configurations of Sound-Absorptive and Sound-Diffusive Panels. *Acoustics* 2, 451-473. DOI: 10.3390/acoustics2030025

Llorca, J., Zapata, H., Alba, J., Redondo, E., & Fonseca, D. (2018). Evaluation between Virtual Acoustic Model and Real Acoustic Scenarios for Urban Representation. In R. Lopez-Ruiz (Ed.), *From Natural to Artificial Intelligence - Algorithms and Applications (pp. 43-68)*. IntechOpen. DOI: 10.5772/intechopen.78330

Long, M. (2006). *Architectural Acoustics*. Elsevier, Academic Press, ISNB 13: 978-012-455551-8 and ISNB 10: 0-12-455551-9

Mehta, M., Johnson, J. & Rocaford J. (1999). *Architectural Acoustics Principles and Design*. Prentice Hall, ISBN: 0-13-793795-4

Maekawa, Z., Rindel, J.H., & Lord, P. (2011). *Environmental and Architectural Acoustics (2nd Ed.).* Spon Press, Taylor & Francis Group, ISBN13: 978-0-203-93135-6 (ebk)

Nocke, C. (2016a). New standards in Architectural Acoustics - a German view. In *Proceedings of ACOUSTICS* (pp. 9-11).

Nocke, C. (2016b). The new standard DIN 18041 – acoustic quality in rooms, Legislation and Regulations in Building Acoustics: Paper ICA2016-716. *22nd International Congress on Acoustics* (pp. 5-9), ICA 2016.

Patania, F., Gagliano, A., Nocera, F., & Cicero, A. (2014). Evaluation of the acoustic performance of a theatrical space set up in a restored Latomia in Ragusa Iblea. *Inter-noise 2014* (pp. 1-9), Melbourne, Australia.

Pillai, R. A., Murugan, S. S., & Gupta, G. (2022). A Complete Analysis of Clarity (C50) Using I-SIMPA to Maintain Ideal Conditions in an Acoustic Chamber. *Sound & Vibration*, 56(1), 51–64., DOI: 10.32604/sv.2022.012085

Prodi N., & Pompoli, R. (2016). Acoustics in the restoration of Italian historical opera houses: A review. *Journal of Cultural Heritage,* 21, 915–921, DOUI: 10.1016/j.culher.2016.03.004

Republic of Turkey Ministry of Culture and Tourism (2013). *4nd Istanbul Regional Board of Protection of Cultural Heritages*, Decision no.107 of 05.06.2013.

Ribeiro, R.S., Amlani, A.M., Conto, J.D., Schwerz, G., Amarilla R.S.D., Sant'Ana, L.H., Avelar, M., Catai, R.E., & Matoski, A. (2021). Acoustical treatment characterization of a classroom with wood-based composites. *Applied Acoustics*, 178, 107967, DOI: 10.1016/j.apacoust.2021.107967

Tronchina L., & Bevilacqua A. (2021). Acoustic study of different sceneries at the São Carlos national theatre of Lisbon. *Applied Acoustics*, 180, 108102, DOI: 10.1016/j.apacoust.2021.108102

URL-1. İstanbul Üniversitesi Fen ve Edebiyat Fakülteleri 1942-1947 (2022, Sep 12), *Edhem Eldem Koleksiyonu*, Salt Research, Retrieved September 9, 2022, from https://archives.saltresearch.org/handle/123456789/79585

URL-2. Decustic. (2022, Sep 12). *Technical specifications acoustic panels, Acoustic panel with aligned holes*, Decustik, Retrieved September 9, 2022, from https://www.decustik.com/arxius/docs/FTP_PAP038_2015_uk.pdf

Journal of Architecture, Arts and Heritage (JAH) – Vol. 1, Issue 2, November 2022
e-ISSN: 2822-437X

Geçmişten Günümüze Çintamani Motifinin Tezhip Eserlerinde Kullanımı

Fatma Köse[1]
Ankara Yıldırım Beyazıt Üniversitesi. Sosyal Bilimler Enstitüsü, Sanat ve Tasarım Yüksek Lisans Programı
kosefatma06@gmail.com
ORCID No: 0000-0001-5705-0971

Dr. Öğr. Üyesi Cengiz Şahin[2]
Ankara Yıldırım Beyazıt Üniversitesi. Görsel İletişim Tasarımı Bölümü
cengizsahin@ybu.edu.tr
ORCID No: 0000-0002-8348-0913

Submission Date: 19.09.2022 / Acceptance Date: 09.10.2022

ÖZET
Bu makale çintamani motifinin tarihsel kökenini ve gelişim sürecini araştırır. Çintamani motifinin türemesi ona yüklenilen anlam doğrultusunda olmuş, her kültürde ifadesi ve sembolize ettiği şeyler farklılaşmıştır. Türk kültürüne geçmesiyle birlikte ise tekrar yorumlanmış ve geniş bir kullanım alanı bulmuştur. Osmanlı geleneksel sanatlarında yaygın olarak yer verilen çintamani motifi, kendine birçok alanda yer edinmiştir. Bu makalede çintamani motifinin Osmanlı tezhip sanatındaki kullanım şekillerine örnekler üzerinden bakılmaktadır. Ayrıca günümüzde yapılan güncel tezhip sanatında nasıl kullanıldığına yine verilen örnekler ile bakılmıştır. Sonuç olarak çintamani motifinin Osmanlı'dan günümüze nasıl bir dönüşüm geçirdiği değerlendirilmiştir.

ANAHTAR KELİMELER
Çintamani, motif, tezhip, Osmanlı, sanat.

GİRİŞ

Çintamani motifi kadim zamanlardan beri kullanılagelmiş çok bilinen ve önemli bir desendir. Günümüze kadar birçok kadim uygarlıkta kullanılmış ve üzerine farklı anlamlar yüklenmiştir. Motif, uygarlıklar arası yolculuklarında zaman içinde farklı yorumlamalarla değişikliğe uğramış, çeşitli kompozisyonlar meydana getirmiştir. Ortaya çıkan bu yeni biçimsel denemelerin temelde aynı kökene ait olduğunu savunup, bunları tek bir motif ve onun türevleri olarak kabul eden araştırmacılar olduğu gibi, bunların farklı kökenlerden gelen ayrı motifler olduğunu savunan araştırmacılar da bulunmaktadır.

Özellikle Türk devletlerinde Şamanist ve Budist inancının kesişmesi sonucu benimsenen bu desen yüzyıllardır kullanılagelmiştir. Zamanla bir güç ve statü sembolü olarak kabul edilip, hükümdarlıkla ilgili birçok alanda yer almış, sıkça desenlerden biri haline gelmiştir. Çintamani motifinin Osmanlı Devleti'nde kullanım alanı ise çok çeşitlidir ve halı, kilim, çini, minyatür, kumaş vb. sanatları içeren geniş bir alana yayılmıştır. Bu alanlardan biri olan tezhip sanatında ise çok ender görülmektedir.

Bu makalenin amacı, Osmanlı geleneksel sanatlarının çoğunluğunda sıkça kullanılan ancak bu sanatların biri olan tezhip sanatında Osmanlı döneminde çok fazla kullanılmayan çintamani motifinin 21. yüzyıl tezhip eserlerinde kullanımını araştırmak ve bu eserlerde nasıl yer aldığını incelemektir. Bunu yaparken öncelikle çintamani motifini tarihsel bir çerçevede ele alarak çıkış noktasına, gelişimine, tanımına ve anlamına bakacağız. İkinci olarak Osmanlı döneminde tezhip sanatında nasıl ele alındığını inceleyeceğiz. Daha sonra yakın tarihte yapılmış (2000-2020) tezhip eserleri üzerinden 21. yüzyılda nasıl kullanıldığını ortaya koymaya çalışacağız.

YÖNTEM

Bu makalenin araştırma evreni çintamani motifinin anlamı, nasıl bir şekle sahip olduğu ve tarihçesidir. Örneklemi ise çintamani motifinin Osmanlı

dönemi tezhip sanatında kullanımına verilen örnekler ve 21. yüzyıl tezhip sanatındaki biçimsel tezahürünün araştırılmasıdır.

ÇİNTAMANİ MOTİFİNE GENEL BAKIŞ

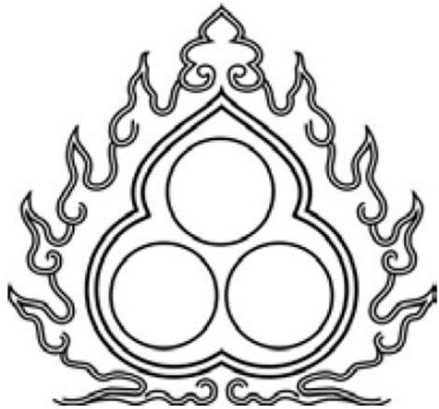
Bu bölümde çintamaninin kelime anlamını irdeleyip, çıkış noktasına ve tarihsel olarak nasıl bir süreç izlediğine yer vereceğiz. Zaman içinde motifle ilgili çıkan bir takım kavramsal tartışmaları ele alıp, kendi bakış açımızı ifade edeceğiz.

Kelime anlamı olarak çintamaniye bakacak olursak, Sanskritçe iki kelimeden meydana gelen bir birleşik isim olduğunu görürüz (Paquin, 1992: 109). Çinta kelimesi "düşünce, istek, dikkat" anlamlarına gelmektedir. Mani kelimesi ise "hazine veya inci tanesine benzeyen top" anlamında kullanılmaktadır (Okumura, 1998: 2).

Çintamaninin ilk olarak Budizm felsefesinden ortaya çıktığı söylenmektedir. Bu felsefeye göre çintamani "bir hazine topu" ya da "arzuları gerçekleştiren cevher" anlamına gelmektedir. Bu topun insanlara arzu ettikleri her şeyi vereceğine inanılır (Okumura, 1998: 2-3). Bu nedenle Budizm öğretisinin kıymetli objeleri arasında yer alan bu motife "dilek incisi" de denmektedir (Eberhard, 2000: 92). Bu inanışa göre, bu incinin koruyucuları ejderlerdir ve bu ejderler aynı zaman Buda'nın da koruyuculuğunu yapmaktadır. Budist kültürünün ipek yolu vesilesiyle Orta Asya, Çin ve Uzak Doğu'ya yayılması, bu motifin Hindistan kaynaklı Budist felsefesinden ortaya çıktığını doğrulamaktadır (Doğanay, 2004: 201). Bazı rivayetlerde ise Sanskritçede "Tschintamani" tama ve mani kelimelerinden ortaya çıkan, Japonca ve Çince' de bulunan bir kelimedir. Buda'nın sembolü olarak tasvir edilen efsanevî bir inciye karşılık gelmektedir ve desen olarak kullanılmaktadır (Arseven, 1983: 412).

Budist öğretisinde çintamaninin üç mücevheri (trinatrayı) (Şekil 1) ifade ettiği de söylenmektedir. Bu üç mücevher Buda, kanun ve rahip ya da Buda, yasa ve keşişlere karşılık gelmektedir (Boisselier, 2004: 154). Paquin'e göre

çintamani ve trinatranın temelde farklı anlamları olmasına rağmen, Budist sanatında mücevher şeklinde ifade edilmesi onları birbirlerinden ayırt edilmesini zorlaştırmıştır (Paquin, 1992: 114).



Şekil 1. *Trinatra motifi (Buckland, 2011: 58).*

Çintamaninin Hindistan'daki Budist öğretisini benimseyen Uygur Türkleri vesilesiyle, Orta Asya Türk inanışlarında var olan körkle monçuk (gökboncuk) ile kaynaşarak Türk kültürüne girdiği varsayılmaktadır (ERDEM, 1988: 106-108). Körkle monçukun Uygurlarda yin-yang ile bağdaştırıldığı da rivayetler arasındadır (Esin, 2004: 78). Yine de bazı kaynaklar körkle monçuk ve çintamaninin ayrı simgeler olduğunu söylemektedir (Yurt, 2018: 231). Körkle monçukun ışık veren gök cisimlerini ve ayı temsil ettiği söylenir. Diğer yandan ise yin-yang felsefesinden ortaya çıktığı için önceleri ay-güneş, dişi-erkek gibi zıt kavramları ifade ederken, Osmanlı'ya geldiğinde nazara karşı koruyucu olarak kullanılan çintamani desenine dönüştüğünden bahsedilmektedir. Çintamani olarak düşünülen körkle monçuk deseni çoğu zaman kün-ay deseninin (Şekil 2) içinde kullanılmaktadır (Esin, 2004: 77-83).

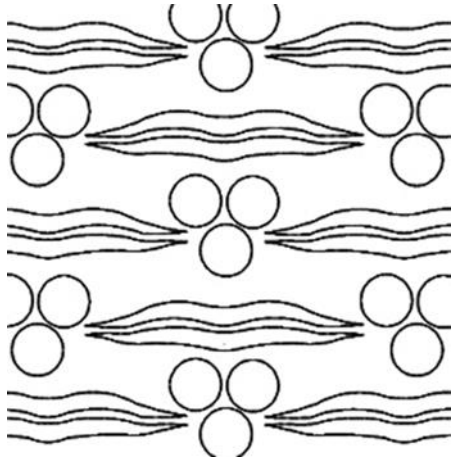
Şekil 2. *Kün-ay motifi (Esin, 2004: 338).*

Uygurlardan itibaren çeşitli Türk devletlerinde kullanılmaya başlayan çintamani motifinin Osmanlı döneminde de var olduğu söylenmektedir. Yalnız, bu motife benzeyen farklı motiflerin de olması bu konuda çeşitli ihtilaflar çıkmasına neden olmuştur. Yetkin'e göre, Türk sanatındaki benek ve pelengi motifleri çoğunlukla karıştırılarak farklı isimlerle ifade edilmiştir. Bu motifler aslında birbirinden farklıdır. Üç daire deseni çintamani, çizgiler ise bulut ve şimşek olarak görülmüştür. Aslında bunlar kaplan ve leopar postlarından esinlenerek ortaya çıkan çizgi ve benek desenleridir (Yetkin, 1991: 108).

Çintamani motifinin farklı şekilde yorumlanması ya da diğer motiflerle karıştırılması doğal karşılanabilir. Genel olarak çintamani, birbirine aynı noktada teğet olarak değen iç içe geçmiş üç dairenin, bir eşkenar üçgenin köşelerini merkez kabul ederek oluşturulan desen olarak görülür (Sözen & Tanyeli, 1992: 61). Ayrıca, üstünde ya da sağ ve sol kenarlarında şerit, şimşek ya da dalga şeklinde bezeme de bulunabilir (Özönder, 2003: 31). Paquin ise motifi tanımlarken üç çeşit tipten bahsetmektedir. Birincisi münferit dairelerden oluşan tiptir. İkincisinde bir araya gelmiş dairelerden oluşan şeritler halinde bulunmaktadır. Üçüncü tipte ise şerit ve daire grupları birlikte ve dairelerin içinde başka daireler de bulunmaktadır (Paquin, 1992: 114). Motiflerin zaman içinde farklı uygarlıklara geçmesi ve ayrıca o uygarlıklarda var olan farklı motiflerle bir arada kullanımı zaman içinde bu karışıklığa sebep olmuş olabilir.

Doğanay'a göre Türk sanat tarihinde var olan kavram karmaşasına, yabancı araştırmacıların şâhî benek ve pelengi motiflerinin yerine çintamani kavramını kullanması neden olmaktadır. Buda'ya ve Budist öğretisine temellendirilen bu motifler, Türk ya da Osmanlı sanatında üstünkörü bir şekilde kabul edilip gerçek karşılığı aranmadan kabul edilmiştir (Doğanay, 2004: 204). Yine de bazı araştırmacılar pelengi ya da benek isimlerini zikretmişlerdir (Irwin, 1997: 235-236). Kaplan postu, şimşek, deniz dalgası ya da Buda'nın dudağı olarak yorumlanan dalgalı şeritler Osmanlı belgelerinde pelenk nakşı adıyla belirtilmiştir (Öz, 1946: 89). Pelenk kelimesi Farsça' da kaplan ve panter anlamına gelmektedir (Şükün, 1984: 494). Timur'un damgası olarak da adlandırılan çintamani motifi biçim olarak Osmanlı'daki şâhî benek motifi ile benzerliğe sahiptir (Birol & Derman, 1991: 169). Çintamani, pelengi, şâhî benek ve körkle monçuk şekil olarak benzerliğe sahip olsalar da derinlemesine incelendiğinde anlam olarak ayrıştıkları görülmektedir (Çoruhlu, 1995: 145).

Sonuç olarak incelediğimiz kaynaklardan çintamani motifinin Budist öğretisinden doğarak, bir takım inanç benzerlikleri ile Türklere geçtiğini ve Osmanlı'ya kadar geldiğini anlıyoruz. Bu yolculuk sırasında anlam değişikliklerinin olması ve yüzyıllar içinde bu motifin şekil değiştirmesi ya da farklı yorumlanması çok muhtemeldir. Çintamani motifinin farklı isimlendirilmelerinin olması ya da farklı anlamlara gelecek şekilde yorumlanmasının yapacağımız çalışmaya bir etkisi yoktur. Biz çintamani motifini yaygın kabul gören, iç içe geçmiş bir noktadan birbirine değen üç daire ve bunların üçlü bir araya gelmesi ve desenin kenarlarında yer alan dalga şeklinde şerit" (Şekil 3) haliyle kabul ederek, bu desenin izini 21. yüzyıl tezhip eserlerinde arayacağız.



Şekil 3. *Çintamani motifi (Keskiner, 2001: 140).*

ÇİNTAMANİ MOTİFİNİN OSMANLI TEZHİP SANATINDA KULLANIMI

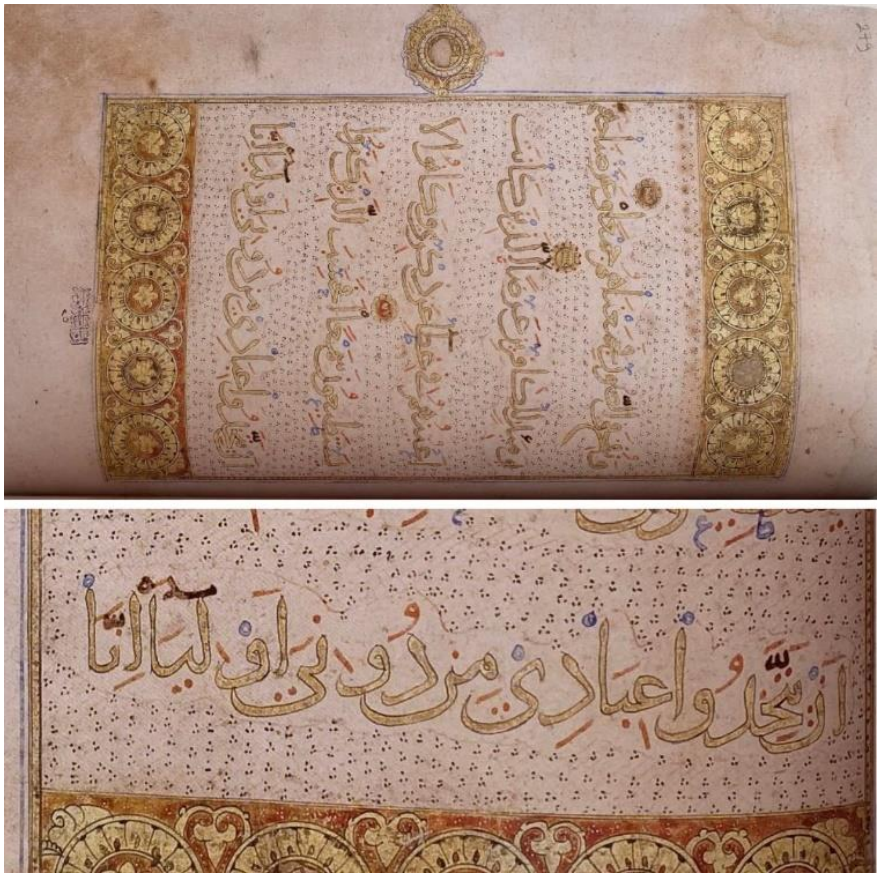
Çintamani motifi Osmanlı geleneksel sanatlarında sıklıkla çini, kumaş ve kilim desenlerinde karşımıza çıkmaktadır (Berkli & Zencirkıran, 2019: 551-567). Yaygın olarak bu sanatlarda kullanılmış olsa da minyatürlerde yer alan padişah kaftanlarında ve diğer birtakım sanatlarda da çintamani nakşını farklı biçimlerde görebiliyoruz (Atasoy, 2016).

Geleneksel sanatların Osmanlı'da saray nakkaş hanesi altında toplanması farklı sanat dalları içinde benzer motiflerin görülmesini, dolayısıyla üslup birliğini sağlamıştır. Böylece saray sanatı bir ekol şeklini almıştır (Çokay, 2003: 147-154). "Altınlamak" anlamında kullanılan tezhip sanatı, Osmanlı'da daha çok kitap sayfalarını süslemek için kullanılan bir sanat dalıdır. Tezhipte bezeme yapılan alan daha küçük ve sınırlı bir alan olduğu için motifler de diğer sanatlarda bulunduğu haline göre daha küçük ve sade şekilde nakşedilmiştir. Bu sanatta yer alan motiflerin belirli tasarım kuralları vardır ve bu kurallar dahilinde desenler bozulmadan kompozisyonlar oluşturulur ve boyaması yapılır. Yani sanatkâr kendi hayal gücü ile bir yorumlama yapar ve eserini oluşturur (Birol, 2012).

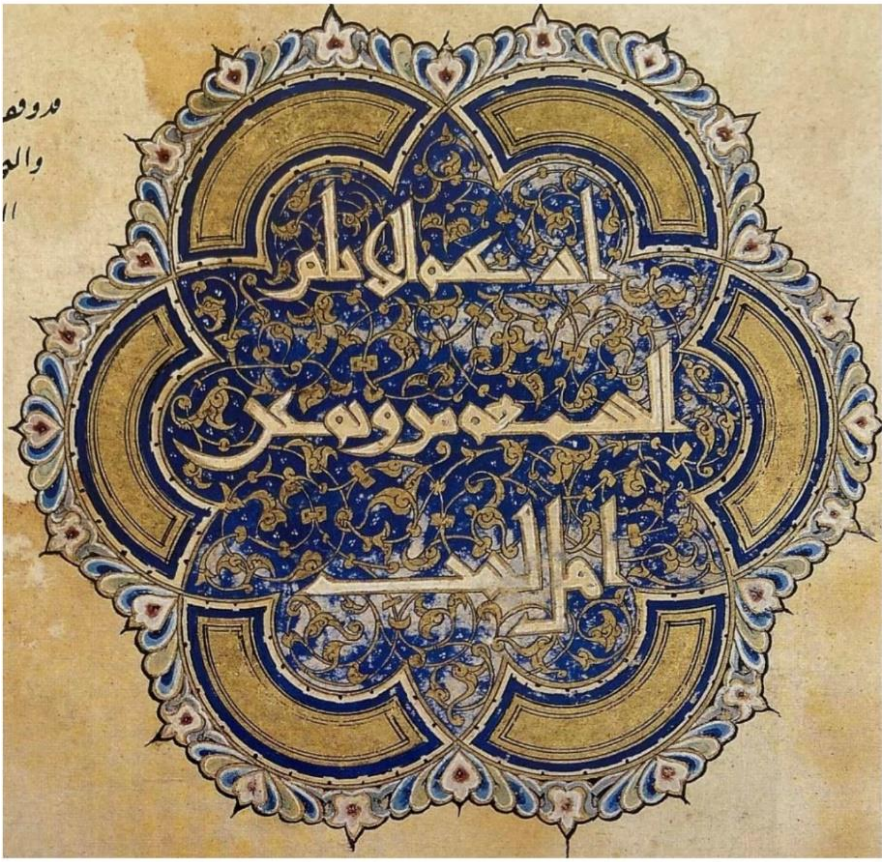
Çintamani motifinin tezhipte az kullanıldığı bilinmektedir. Üçgen formu alacak şekilde üç daire ve iki dalgalı şerit olarak görülen çintamani farklı formlarda da görülmektedir. Bazen sadece üç daire, bazen iç içe bir noktadan teğet geçen dairelerle oluşturulmuş üç daire, bazen de bu ikisinin yanında 2 dalgalı şeritten meydana gelmektedir. Osmanlı'da güç ve sultanın egemenliğinin bir simgesi olarak kullanıldığı söylenmektedir (Birol, 2012).

Osmanlı döneminde çintamani motifinin yer aldığı tezhip eserlerine bakacak olursak, çintamani motifinin Doğanay'ın (2004) belirttiği gibi nakş-ı benek (benek nakşı/şâhî benek) olarak yer aldığını söyleyebiliriz. Tezhipte "kaplan ayağı", "pars beneği" ya da "çintamani" şeklinde adlandırılan bu motif, küçük ve büyük alanlarda bezeme unsuru olarak kullanılmaktadır ve üç nokta şeklinde görülmektedir. Çoğunlukla yanında ayrıca iki dalgalı şerit yer almadan tek başına kullanılmaktadır.

Kur'an-ı Kerim sayfasında açık renk kâğıt üzerinde yer alan koyu renk çintamani motifleri hat yazılarının etrafında zemin bezemesi olarak uygulanmıştır. Geniş bir alanda yer alan hat yazılarının etrafında büyük boşluklar oluştuğu için, bu boşlukları doldurmak adına serbest teknikte çintamani motifini erken dönem bir eser üzerinde görmekteyiz (Şekil 4). Koyu mavi zeminin ağırlığına karşı beyaz çintamani motifleri serbest teknikte bezenerek zemine hareket ve zenginlik katmıştır (Şekil 5).



Şekil 4. *Kur'an-ı Kerim, Abbasi dönemi, 419 (m.1028) (Unustası, 2010: 210).*



Şekil 5. *Mavi zemin üzerine çintamani bezeme, S. K. Ayasofya 2765, 682 (m. 1283) (Özen, 2003: 26).*

Lacivert zemin üzerindeki çiçek motiflerinin arasında kalan alana kontrast bir renk olan beyazla çintamani bezemesi serbest teknikte uygulanmıştır. Bu eserde dikkate değer bir diğer unsur çintamaninin dört yapraklı yonca biçimindeki orta alanın bordürlerinde de bezeme olarak kullanılmasıdır. Bu özelliğiyle ender görülen örneklerden birisidir (Şekil 6). Levha tezhibinde yer alan çiçek motifleri çevresinde siyah-kahverengi zemin üzerine kontrast oluşturacak şekilde beyaz renk ile çintamani deseni serbest teknikle

uygulanmıştır. Üç nokta bezeme şekilde, dar bir alan üzerine bezenmesi, diğer zeminle arasındaki farkı ortaya koymuş ve ayrıştırıcı olmuştur (Şekil 7).

Şekil 6. *Lacivert zemin üzerine çintamani bezeme, S. K. Fatih 4285, 701 (m. 1301-2) (Özen, 2003: 38).*

Şekil 7. *Osmanlı Dönemi Kur'an-ı Kerim 1460 civarı levha tezhibi (Unustası, 2010: 364).*

Mavi-bordo zemin üzerindeki çintamani motifleri kontrast bir renk ile kullanılarak zeminde ortaya çıkması sağlanmıştır. Zemindeki büyük boşluklar, serbest bir şekilde çintamani ile doldurularak bezeme zenginleştirilmiştir (Şekil 8-üst). Hat yazılarının arasında kalan beyaz rumilerin ve hat yazılarının yanında çintamani desenleri mavi zeminin üzerinde daha koyu bir mavi rengi ile yapılmıştır. Zemindeki boşlukları doldurarak desenin daha zengin görünmesi amaçlanmış olabilir (Şekil 8-alt).

Şekil 8. *Mavi-Bordo zemin üzerine çintamani bezeme, S. K. Turhan Valide Sultan 48, 870 (m.1465-6) (Özcan, 2009: 314) ve mavi zemin üzerine çintamani bezeme, S. K. Süleymaniye, 1025 (m.1616) (Özcan, 2009: 304).*

Kur'an-ı Kerim serlevhasındaki fasılbaşlarında yer alan çintamani motifleri, koyu mavi zemin üzerine kontrast beyaz renk ile bordür olarak bezenmiştir.

Zikzak şeklindeki çizgiler ise çintamani motiflerinin arasında üçgen şekli vurgusu ile yer almaktadır (Şekil 9).

Şekil 9. *Osmanlı dönemi Kur'an-ı Kerim serlevha, 1097 (m.1685-6) (Unustası, 2010: 426).*

Rokoko tarzı çiçek tarama ve Hilye-i Şerif'in altında kalan boşluk yine altın zemin üzerine çiçeklerle süslenmiş boşlukları da mühre ile yapılan çintamani motifi ile doldurulmuştur. Bu da zeminde altın üzerine esere ışıltı ve derinlik katmıştır (Şekil 10-üst). Eserde yer alan fasılbaşıların birinde çintamani, bulut

ve 2 dalgalı şerit (pelenk nakşı-kaplan postu deseni) desenlerinin bir arada kullanıldığını görüyoruz. Tezhip eserlerindeki nadir örneklerden biri olarak, döneminin üslubunu barındırıyor diyebiliriz. Yine hemen altında yer alan lale deseninde de altın zemin üzerine iğne perdahı tekniğiyle yapılmış çintamani motiflerini de görmekteyiz (Şekil 10-alt).

Şekil 10. *Altın zemin üzerine çintamani bezeme, 1717 tarihli "Hilye-i Hakanî" isimli yazmanın ketebe sayfasındaki gül dalı (Özcan, 2009: 493) ve altın üzerine çintamani bezeme ve çintamaninin bulut ve 2 dalgalı şerit ile kullanımı (Özcan, 2009: 365).*

Kitap kabı üzerindeki rumi desenlerinin arasında kalan boşlukları, çintamani motifleri ile serbest bir şekilde ancak göze hoş gelecek şekilde bezenmiştir. Çintamani motifi kırmızı zemin üzerinde, hem zeminin renginin kırmızılığının çarpıcılığını azaltmış hem de motifin noktaları koyu zemin üzerinde yıldızlar gibi ışık katmıştır (Şekil 11).

Şekil 11. *Kitap cildi üzerinde çintamani kullanımı (Özcan, 2009: 405).*

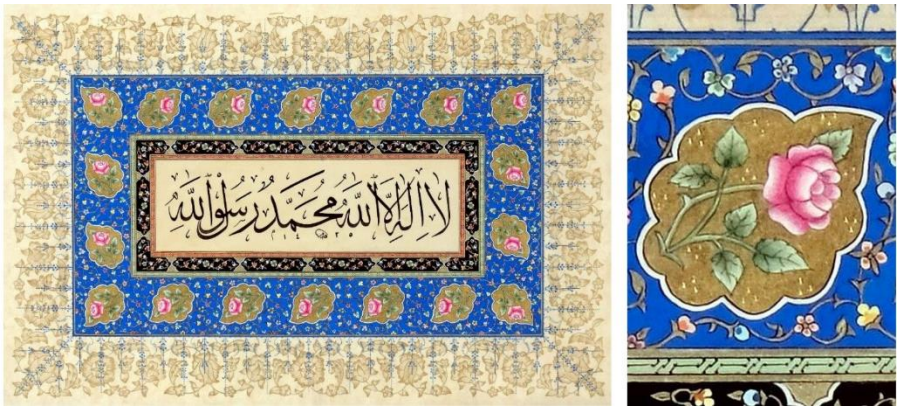
Rokoko üslubunda yapılmış Kur'an-ı Kerim serlevhasında zemin doldurma tekniği olarak serbest çintamani bezeme yapılmıştır. Burada çiçek motiflerinin arkasındaki mavi-gri zemin üzerinde altın rengi üç nokta olarak çintamani deseni uygulanmıştır. Yine sayfa kenarındaki altın zemin üzerinde de iğne perdahı tekniğiyle yapılan çintamani bezemesini görmekteyiz (Şekil 12-üst). Eserde büyük yaprak-rumi motiflerinin arasına bezeme olarak çintamani yapılmıştır. Burada boşluğu doldurmak amaçlanmış olabilir. Pembe zemin üzerine yapılan çintamani motifi zeminin pembeliğine ağırlık katmış ve boş olan zemini zenginleştirmiş (Şekil 12-alt).

Şekil 12. *Osmanlı dönemi Kur'an-ı Kerim serlevha, 1262 (m.1845-6) (Unustası, 2010: 442) ve açık pembe zemin üzerine çintamani bezemesi, levha tezhip, Kur'an cüzü, 1305 tarihli (m. 1887) (Özcan, 2009: 250).*

ÇİNTAMANİ MOTİFİNİN 21. YÜZYIL TEZHİP ESERLERİNDE KULLANIMI

21. yüzyılda hayata geçirilen tezhip eserlerine baktığımızda, eski saray ekolünün devam ettiğini, yine aynı motiflerin ve stilin kullanıldığını birçok yerde açık ve net bir şekilde görebiliriz. Bu durum sanat içinde bir devamlılık olarak okunabilir. Elbette, tezhip sanatı belli kurallar üzerine inşa edilmiştir ve bu sanatı icra ederken de bu kurallara bağlı kalmak gereklidir. Bununla birlikte, günümüz sanatçıları hem bu kurallara bağlı kalıp hem de yeni tasarımlar deneyerek sanata özgün yorumlar katmaya da çalışmaktadır. Bu bölümde inceleyeceğimiz 21. yüzyıl sanat eserlerini çintamani motifini kullanımı açısından 2 kategoriye ayırabiliriz. Birincisi, Osmanlı dönemindeki kuralları devam ettiren ve o dönemki usul ve teknikleri birebir şekilde günümüzdeki eserlere taşıyan uygulamalardır. Bunlarda çintamani motifinin kullanımı da birebir örtüşmektedir. İkincisi ise çintamani motifini yorumlayarak tezhip eserlerine yansıtan ancak yine de klasik tezhip kurallarına bağlı kalan tasarımsal uygulamalardır. Şimdi örnekler üzerinden bu uygulamalara bakacağız.

Altın zemin üzerine iğne perdahı tekniği ile yapılan çintamani deseni gül motifinin göze daha çarpıcı ve ışıltılı görünmesini sağlamıştır. Aynı zamanda zemin de bulunan büyük boşluğu da doldurmuştur (Şekil 13).



Şekil 13. *Altın üzerine çintamani bezeme, Tezhip: Fatma Köse.*

Karma tekniklerin uygulandığı bu eserde hem tarama hem klasik tezhip üslupları görülmektedir. Altın zemin üzerine yapılan rumi desenlerinin aralarında iğne perdahı tekniği ile çintamani desenleri uygulanmıştır ve eseri daha gösterişli hale getirmiştir (Şekil 14).

Şekil 14. *Altın üzerine çintamani bezeme, Tezhip: Fatma Köse.*

Yakın dönem eserlerinden olan bu çalışmada, çintamani noktaları eserin en dış bordüründe kırmızı zemin üzerine altın noktalar ile uygulanmıştır. Burada motifin kimi yerde çintamani bezemesinde görüldüğü gibi üç noktalı kimi yerlerde ise gelişigüzel tek noktalı olarak kullanıldığı görülmektedir. Zemin doldurmak için yapılmıştır, altın rengi ile eserin geneline uyumlu hale getirilmiştir (Şekil 15-sol). Eserde bulunan yoğun altın zemin üzerinde iğne perdahı tekniği ile çintamani motifi üç nokta olarak bezenmiştir. Böylece büyük bir alan kaplayan altın kaplama alanın ışıltısı artırılmıştır (Şekil 15-sağ).

Şekil 15. *Ya Muhammed, Tezhip: Emel Duan (Kutlu, 2003: 76) ve altın zemin üzerine çintamani, Tezhip: Payende Tellioğlu (Kutlu, 2004: 26).*

Son dönem örneklerinden Hilye-i Şerif'te altın zemin üzerine çintamani bezeme yine iğne perdahı tekniğiyle üç nokta şeklinde uygulanmıştır. Geniş bir alanda yer alan altın zemine parlaklık vermiş ve boşluğu doldurmuştur (Şekil 16).

Şekil 16. *Hilye-i Şerif, Tezhip: Faruk Taşkale (Hürel, 2011: 9).*

Yakın dönem eserlerinden biri olan bu çalışmada padişah tuğrası ile klasik tezhip uygulaması yapılmıştır. Kompozisyonda ayrıca padişahlarla özdeşleşen çintamani motifi tuğranın hemen üzerine konumlandırılarak, motifin kullanımına orijinal bir yorum katılmıştır (Şekil 17-üst). İç içe geçmiş üç daire şeklinde oluşturulmuş çintamani motifinde klasik tezhip tekniği kullanılmıştır. Daireler farklı renklerde ve motiflerde bezenerek çintamani motifi vurgulanmıştır. Çintamaninin kenarından çıkan saz yolu yapraklar ile kompozisyon bütünleştirilerek, en üstte yer alan hat yazısı ile tamamlanmıştır. Eser, günümüzde tezhip eserlerinde yer alan çintamani motifine farlı bir yorum getirmiştir (Şekil 17-orta). Klasik tezhip üslubu ve tarama kullanılarak yapılmış bu eserde, tasarımın odak noktasında çintamani motifine yer verilmiştir. Kaftan desenlerinde bulunan lale motifleriyle de

zenginleştirilen tasarım, çintamani motifini ise iç içe geçen üç daire şeklinde uygulayarak özgün eserlerden biri olmuştur (Şekil 17-alt).

Şekil 17. *Üst. Tuğra ve çintamani kompozisyonu, Orta. Saz yolu yaprak ve çintamani kompozisyonu, Alt. Şukufe ve çintamani kompozisyonu, Tezhip: Memnune Birkan.*

SONUÇ

Çintamani motifi, geçmişten beri Osmanlı sanatlarında kullanılan bir bezeme motifi olmuştur. Motife atfedilen çeşitli anlamlar ve yorumlamalar vardır ve zaman zaman farklı isimlerle anıldığı da görülmektedir. Bu durum motifin farklı dönemlerde var olduğunun ve çokça kullanıldığının kanıtı niteliğindedir. Osmanlı geleneksel sanatlarında yaygın kullanılan motiflerden birisi olan çintamani, tezhip eserlerinde de sıklıkla görülmektedir.

Çalışmamızda incelediğimiz eski dönem tezhip eserlerini geniş bir zaman dilimi içinden seçerek, çintamani motifinin yüzyıllar içinde tezhip eserlerinde kullanımını göstermek istedik. Neredeyse 11. yüzyıldan başlayıp 19. yüzyılın sonuna kadar ele aldığımız 800 senelik eserlerde görülmektedir ki, çintamani motifi daha çok zemin bezemesi olarak üç nokta şeklinde serbest teknikte kullanılmıştır. Kimi zaman renk üzerine, kimi zaman altın üzerine uygulanan çintamani motifi, zemine göre fark edilecek zıt renkler ile uygulanmış ve zeminde yer alan rengin etkisini kırmıştır. Daha çok tek başına uygulandığı görülen çintamani motifinin, bulut ve 2 dalgalı şerit ile uygulandığı örnekler nadirdir. Zemin bezemesi haricinde bordür olarak kullanıldığı örnekler de görülmektedir ancak sayıları fazla değildir.

Günümüz tezhip eserlerinde çintamani kullanımına baktığımızda ise, klasik tezhip tekniğinde yer alan uygulamaların devam ettiğini görmekteyiz. Zemin üzerine kontrast oluşturacak renklerle üç noktalı çintamani uygulamasını ve altın üzerine iğne perdahı tekniği ile üç noktalı çintamani uygulamasını günümüz örneklerinde de sıkça yer almaktadır. Bunun dışında, çintamani motifini modern şekilde yorumlayarak kompozisyon oluşturan örnekler de bulunmaktadır. Bu eserler, çintamani motifini eski usullere göre daha büyük ve göze çarpan şekilde bir tasarım ögesi olarak kullanmış ve farklı bir yorum katmıştır. Bu da desenin önemini artırmış ve ön plana çıkmasını sağlamıştır.

Sonuç olarak diyebiliriz ki, çintamani motifi geçmişten günümüze kadar geleneksel Türk sanatlarında bir bezeme unsuru olarak yer almıştır ve almaktadır. Günümüzde motifle ilgili hem klasik uygulamaların devam ettiğini hem de modern yorumlamaların olduğunu görmekteyiz. Buna dayanarak çintamani deseninin tezhip eserlerinde hala önemini ve değerini aynen koruduğunu söyleyebiliriz. Bu durum, yüzyıllardır çintamaniye atfedilen kıymetin de adeta bir göstergesi olmuştur.

KAYNAKÇA

Arseven, C. E. (1983). *Sanat Ansiklopedisi* (Cilt 1). Görsel Yayınlar. İstanbul.

Atasoy, N. (2016). *"Kaftan", TDV İslâm Ansiklopedisi* (Cilt Ek-1, ss.709-710). Türkiye Diyanet Vakfı Yayınları, İstanbul.

Berkli, Y. & Zencirkıran, A. (2019). Osmanlı Çini Sanatı ve Halı Sanatının Ortak Motifleri, *Ekev Akademi Dergisi*, (80), 551-567. DOİ: 10.17753/Ekev1305

Birol, İ. A. (2012). *"Tezhip", TDV İslâm Ansiklopedisi* (Cilt 41, ss. 61-62). Türkiye Diyanet Vakfı Yayınları, İstanbul.

Birol, İ. A. & Çiçek, D. (1991). *Türk Tezyînî San'atlarında Motifler.* Kubbealtı Akademisi Yayınları, İstanbul.

Boisselier, J. (2004). *Buda'nın Bilgeliği*. Çev: N. Feyza Zaim. Yapı Kredi Yayınları, İstanbul.

Buckland, R. (2011). *İşaretler, Semboller ve Alametler, Maji ve Ruhsal Semboller Rehberi.* Çev: Derya Engin. Neden Kitap, İstanbul.

Çokay, M. Ö. (2003). Osmanlı saray sanatı ekolünde sanatçılar ve halı üretim. *İslam, Sanat, Tarih, Edebiyat ve Musikisi (İSTEM) Dergisi,* (1), 147-154.

Çoruhlu, Y. (1995). *Türk Sanatında Hayvan Sembolizmi.* Seyran Yayınları, İstanbul.

Doğanay, A. (2004). Türk sanatında pelengî ve şâhî benek nakışları ya da çintamani yanılgısı. *Dîvân: Disiplinlerarası Çalışmalar Dergisi*, (17), 193-218.

Eberhard, W. (2000). *Çin Simgeleri Sözlüğü*. Çev: Aykut Kazancıgil-Ayşe Bereket. Kabalcı Yayınevi, İstanbul.

Erdem, S. (1988). Alemin Tarihçesi ve Monçuk, Hilâl Boynuz Alemlerin Menşeleri Üzerine. *Sanat Tarihi Araştırmaları Dergisi*, 1(3), 103-117.

Esin, E. (2004). *Orta Asya'dan Osmanlı'ya Türk Sanatında İkonografik Motifler.* Kabalcı Yayınevi, İstanbul.

Hürel, B. (2011). Hayatını Tezhiple Süsleyen Sanatçı: Faruk Taşkale. *İstanbul Büyükşehir Belediyesi Sanat ve Meslek Eğitimi Kursları (İSMEK) El Sanatları Dergisi*, (12), 6-17.

Irwin, R. (1997). *Islamic Art.* Laurence King, London.

Keskiner, C. (2001). *Türk Motifleri.* Türkiye Turing ve Otomobil Kurumu, İstanbul.

Kutlu, H. (2003). *Gül Sergisi Albümü.* Kaptan Ofset, İstanbul.

Kutlu, H. (2004). *Hz. Mevlana'nın 731. Vuslat Yıldönümü Sergisi Albümü.* T.C. Kültür ve Turizm Bakanlığı İl Kültür ve Turizm Müdürlüğü Yayınları, İstanbul.

Okumura, S. (1998). Çintamani Motifinin Kökenleri, Gelişimi ve Kullanım Alanları, [Yayınlanmamış Yüksek Lisans Tezi]. M.Ü. Güzel Sanatlar Üniversitesi.

Öz, T. (1946). Türk Kumaş ve Kadifeleri (Cilt 2). Ekonomi Bakanlığı Yayınları, İstanbul.

Özcan, A. R. (2009). *Hat ve Tezhip Sanatı*. Kültür ve Turizm Bakanlığı Yayınları, Ankara.

Özen, M. E. (2003). *Türk Tezhip Sanatı.* Göze Kitap ve Yayınevi, İstanbul.

Özönder, H. (2003). *Ansiklopedik Hat, Tezhip Sanatları Deyim ve Terimleri Sözlüğü.* Sebat Ofset, Konya.

Paquin, G. (1992). "Cintamani". *Hali*, (64), 104-119.

Sözen, M. & Tanyeli, U. (1992). *Sanat Kavram ve Terimleri Sözlüğü*. Remzi Kitabevi, İstanbul.

Şükün, Z. (1984). *Farsça-Türkçe Lügat Gencine-i Güftar Ferheng-i Ziya.* Milli Eğitim Bakanlığı Yayınları, İstanbul.

Unustası, M. (2010). *1400. Yılında Kur'an-ı Kerim*. Antik A.Ş. Kültür Yayınları, İstanbul.

Yetkin, Ş. (1991). *Türk Halı Sanatı*. Türkiye İş Bankası Kültür Yayınları, İstanbul.

Yurt, D. (2018). Osmanlı Kumaş Sanatında Çintemani Motifinin Biçimsel Evreleri [Yayınlanmamış Sanatta Yeterlik Tezi], Dokuz Eylül Üniversitesi.

URL-1. TDK Güncel Türkçe Sözlük. (2021, Haz 3). Çintemani. Türk Dil Kurumu Sözlükleri. Erişim tarihi Haz 3, 2021, https://sozluk.gov.tr/çintemani

Journal of Architecture, Arts and Heritage (JAH) – Vol. 1, Issue 2, November 2022
e-ISSN: 2822-437X

الحفاظ أم إعادة الإعمار بعد الصراع: تحليل معايير وقيم التراث الثقافي السوري

Salah Hajismail[1]
Ankara Yildirim Beyazit University
salah.hajismail@aybu.edu.tr
ORCID No: 0000-0001-6682-6663

Emanuele Morezzi[2]
Politechnic University of Turin
emanuele.morezzi@polito.it
ORCID No: 0000-0001-6533-9660

Submission Date: 25.11.2022 / Acceptance Date: 25.11.2022

ملخص

أثرت سنوات الصراع في سوريا على التراث الثقافي بشدة وهددت القيم الاجتماعية والرمزية. هذا البحث يوضح أولا وضع مدينة حلب الحالي، من خلال عرض بعض الحالات ذات القيمة الثقافية العالية لمبان تضررت من الصراع ، وبعضها انهار تماما، والتي تمثل رابطا هاما لمواطني حلب مماثلة لفكرة "Istanza Psicologica" في نظرية روبرتو بانة Roberto Pane. يهدف البحث ثانيا إلى تحليل معايير التدخل في "اليوم التالي" (الحفظ ، الترميم ، التعزيز واعادة الإعمار في نهاية المطاف) في هذا التراث المتضرر من خلال البحث عن القيم الثقافية الهامة لهذه المباني المتضررة او المدمرة. وأخيرا ، فإن البحث يخلص إلى بعض الاقتراحات حول التدخل الأمثل في

حالات مختلفة تمثل القيم أنفة الذكر. والحاصل أن البحث يهدف إلى إشراك النقاش الدولي حول الحفظ والترميم في حالة حرجة للتراث الثقافي في الأزمات.

الكلمات المفتاحية

التراث السوري، اعادة الاعمار، الحفاظ، الحرب، الدمار.

ABSTRACT

The years of conflict in Syria has affected the cultural heritage severely and threatened social and symbolic values. This paper illustrates firstly the real condition of the city of Aleppo, through presenting some cases of high cultural value buildings damaged by the conflict, even some were totally collapsed, which represent an important bond of Aleppo citizens similar to the idea of “Istanza Psicologica” theorized by Roberto Pane. Secondly, the research aims to analyze the criteria of “second-day” intervention (conservation, restoration, enhancement

and eventual reconstruction) on this damaged heritage, by investigating the cultural significant values of these buildings damaged or completely destroyed. Finally, the paper concludes with a few suggestions about the optimum intervention of different case studies represents the values mentioned before. To sum up, the research aims to involve the international debate about conservation and restoration with a critical situation of cultural heritage in crisis.

KEYWORDS

Syrian Heritage, Reconstruction, Conservation, War, Destruction.

المقدمة

شهدت حلب لأكثر من ثلا ث سنوا ت بين 2013-2016 احداثا اليمة أثرت على حياة جميع سكانها وجميع القطاعات بما في ذلك قطاع الترا ث المبني. تعرضت العديد من الآثار والمناطق القديمة للتدخريب والدمار ، كماتضررت القلعة وغيرها من المباني التاريخية المهمة ، ليس فقط في تاريخ سوريا ولكن أيضا في تاريخ البشرية. تشير التقارير إلى أنه حتى تشرين الثاني (نوفمبر) 2013 تم تدمير أكثر من ٪53من مدينة حلب القديمة (Abdulkarim, 2013) . وتعرض 113 معلما من المعالم الأثرية المختلفة لأضرار جزئية أو كلية في نفس الفترة. هذا يمثل خسارة فادحة ليس فقط لسوريا كبلد ولكن أيضا للمجتمع الدولي الذي لم يعر هذه الحقائق سوى القليل من الاهتمام.

المبادرات الرئيسية الوحيدة التي تم اتخاذها لتعزيز الفهم السليم لحماية هذا التراث تتمثل في عدد قليل من الأبحاث واتفاق "قائمة عدم القصف" وهي قائمة بالمناطق الجغرافية أو المجمعات أو المنشآت التي يمنع التخطيط للاستيلاء عليها أوتدميرها ، وقد أعدت منظمة الترا ث من أجل السلام والدرع الأزرق ،بالتشاور الكامل مع الزملاء السوريين ، قائمة بأهم عشرين موقعا أثريًا وتاريخيا في حلب لاستخدامها من قبل جميع أطراف النزاع (URL-1) . من خلال التحقيق في هذه السيناريوهات الثقافية ، كان من أ هم المبادرات قرار **اليونسكو** إعلان حلب "**موقع تراث عالمي في خطر**" ، مايعني نقلها إلى قائمة الترا ث العالمي في خطر ، محاولين من خلال هذا الإجراء تنبيه الخبراء في جميع أنحاء العالم. ومع ذلك ، لم يكن لهذا الإجراء سوى نتائج بيروقراطية ورمزية ، دون أي تأثير حقيقي على أرض الواقع: على العكس من ذلك ، فقد أعطى مؤخراً تأثيراً سلبياً. بعض المتطرفين ، في الواقع ، بعد هذا "الاعتراف الدولي بالقيمة" قررت تدمير الأضرحة المقدسة لشخصيات دينية مشهورة في حلب (URL-2) ورد ت الأطراف الأخرى بتدمير مواقع أخرى. ومع ذلك ، لاتركز الدراسة على الدمار الناجم عن جانب واحد من الصراع السوري ، ولكنها تهدف إلى الحصول على نظرة عامة شاملة على ترا ث حلب نتيجة هذه الأزمة وخلق قاعدة لإلقاء نظرة عامة أعمق على هذا الواقع المتضرر. انطلاقاً من

هذه الحقائق، يهدف البحث إلى عرض الوضع الأخير للترا ث الحلبى خلال هذه الأزمة ، من خلال عرض أمثلة مختلفة ودراسات حالة من أجل إشراك المجتمع الدولي من الخبراء في دراسة وفهم وحماية هذا التراث حالياً وفي اعمال التدخل والحفظ وإعادة الإعمار في المستقبل أيضا.

الدمار: السبب والنتيجة

في ظل الوضع المعقد للصراع السوري، يبدو من الصعب تصنيف الدمار والأضرار التي حدثت في حلب ، لكن الورقة تحاول القيام بذلك ، اعتماداً على الدوافع التي تسببت في تلك الأضرار ، التي سببها جميع المشاركين في الصراع لأسباب مختلفة. من الممكن تحديد خمسة أسباب مع مثال رئيسي واحد على الأقل والذي قد يفسر بطريقة أفضل، ليس فقط الأسباب النظرية للضرر ، ولكنها تظهر أيضا آثاراً حقيقية على الترا ث المبني والعلاقة النفسية العاطفية للناس المتعاقبين على هذا التراث .سيتم ربط كل سبب (مسبب؟)ب كلمة محددة لتلخيص الإجراءا ت المعقدة بأفكار قصيرة: أحد الأهداف الرئيسية للورقة ، في الواقع ،يتم تمثيله ليس فقط بالإرادة لتصنيف جميع الأسباب التي حدثت ، ولكن أيضا لتأكيد الفارق الكبير بينهم. هذا الاختلاف الرئيسي ، في الواقع ،سيشكل أساسا للمنهجية المستقبلية حول تدخل الحفاظ على الترا ث أو إعادة الإعمار ، في محاولة للنظر في أسباب الضرر كجزء متكامل من خطة الحفاظ.

السبب الأول هو **العقاب** ، حيث يحاول كل طرف في النزاع معاقبة "أعدائه "من خلال تدمير ممتلكاتهم. كما تظهر حالة **البازار المغطى** في حلب ، فإن الثوار قد أضرموا النار فيه لمعاقبة تجار حلب على عدم دعمهم للثورة (الشكل 1).

الشكل 1. *سوق حلب المغطى بعد الحريق.*

إن الرغبة في تدمير هذه الآثار بالذات ،تدل على نية معاقبة جزء معين من المجتمع: التجار. كان هذا البازار ، في الواقع ، القلب الناشط للأنشطة التجارية لمعظم المدن الصناعية والتجارية في البلاد ، ولم يكن مجرد موقع أثري للزيارا ت السياحية والدراسة فحسب،كان أحد أكبر الأسواق المغطاة في العالم من عصر الإمبراطورية العثمانية ، وأطول سوق تاريخي في العالم نجا حتى بداية الصراع حيث بلغ طوله 15 كم متضمنا 37 قطاعا مختلفا. لذا ، فإن حرقه يمثل نية المتمردين لإشراك طبقات اجتماعية جديدة في الصراع ، وإجبارهم على المشاركة في القتال. لقد نقل الصراع إلى مستوى جديد: كان صرا عا بين طرفين مختلفين من قبل واصبح بعده بين المواطنين وتم ادخال هوياتهم في الصراع.

سبب و مسبب آخر يتعلق "**بالتدمير العرضي"** الذي حدث بالخطأ من قبل قوات الجيش التي قصدت قصف ملاجئ المقاتلين وبدلا من ذلك تم ضرب صرح مهم: **بلدية حلب القديمة** هذا حدث ذلك عندما قامت القوات الجوية السورية بإطلاق البراميل المتفجرة على أحياء البلدة القديمة وتدميرها(الشكل 2).

الشكل 2. *مبنى الهجرة والجوازات (البلدية القديم) بعد القصف.*

البلدية القديمة التي شيدت عام 1916 م على الطراز العثماني، وزخارفها الغنية مع مدخل خاص ذو السلالم المجنحة والساعة فوقه. بالمقارنة مع المثال السابق لم تمثل هذه الحقيقة رسالة رمزية للشعب ، بل مجرد خسارة أخرى من تراث المدينة المهم ومعالمها الجميلة.

جميع الأسـبا ب المتبقية مرتبطة بقيم **رمزية** . الحاجة إلى تقسـيم هذه المجموعة من المفاهيم تظهر مدى تعقيد الأزمة ، وتشرـح القيم المختلفة والعلاقات النفسـية بالترا ث ، على الرغم من أن الدمار والصراع قد يؤثران على جوانب وقطاعات مختلفة من اهالي حلب.

إن تدمير الشـكل الرمزي لمدينة ما ، المرتبط بهوية الشـعوب وصورتها عن المدينة ، هو أمر وظيفي لتحفيزهم على التصرـف مع أو ضـد الأفعال وردود الأفعال الأخرى. على سـبيل المثال ، كان تدمير مئذنة الجامع الأموي الكبير في حلب من قبل الثوار (الشكل 3) ، لما لها من قيمة عاطفية وتاريخية ضـخمة ، واتهام الجيش السـوري بذلك الهدم بهدف دفع الناس إلى دعم الثوار وإظهار القوا ت الحكومية كمجرمين.

الشكل 3. *المسجد الاموي بحلب بعد تفجير المئذنة الكلي.*

في المقابل ، اســتهدف الجيش المســاجد والمآذن للتأثير على روح الثوار من خلال إظهار الرغبة في تدمير مهد الثورة ، حيث بدأ كل شيء(الشكل 4).

الشكل 4. *بعض المأذن المتضررة ، مئذنة جامع القاضي بحلب (اعلى) ومئذنة الجامع العمري بدرعا (اسفل).*

تتركز مجموعة واحدة من الدمار الرمزي من خلال **الدوافع الدينية**. حتى لو كانت حركة التظاهرات قد بدأت في سوريا بشكل سلمي ، مطالبة ببلد أكثر ديمقراطية وانفتاحًا ، لكن مؤخرا وبشكل لاحق بدأت المظاهرات تسترشد بدوافع مختلفة ، مثل الدوافع الدينية ، وبشكل لاحق اخذت تتحول الى حرب اهلية. ومع ذلك ، فإن الدافع الديني يشكل أحد الأسباب الرئيسية التي تولد الحرب، والذي ولد العديد من المجموعات المختلفة التي بدأت في القتال ومحاولة إقناع الخصم بأن يغادر المعركة وينضم إلى مجموعته / قضيته. تمثلت الأداة الأساسية لتحقيق هذا الهدف من خلال تدمير الرموز الدينية لمنافسيهم ، مثل ما فعلت داعش وجبهة النصرة ودمرت العديد من مزارات الشخصيات الدينية في تاريخ حلب. حيث اعتبروا تلك الأضرحة كرمز للكفر ، ومن وجهة نظرهم هذا من أسباب تأخير انتصارهم، وعلى الطرف الاخر يعتبر تدمير القوات السورية للمساجد والمآذن مثال آخر. (الشكل 5).

الشكل 5. *جزء من تدمير جامع العادلية بحلب.*

من الواضح أنه بخلاف الجماعات التي تقرر القتال لأسباب دينية ،عندما تختار تمثيل إيمان كامل عن طريق العنف ، كل الأشخاص المدنيين الذين لم يشاركوا مباشرة في الصراع ولكنهم مرتبطون بذلك الدين يعانون من صدمة هائلة من الأضرار التي لحقت برموز دينهم الأكثر أهمية.

تأثير فقدان التراث هذا ، في الواقع ، له عواقب ليس في المواقع المبنية من مدينة حلب فقط ولكن ايضا في ذهن كل المؤمنين في العالم الذين يشعرون بالفجيعة بسبب الصراع.

جزء آخر من التدمير الرمزي مرتبط بمفهوم **إنكار التاريخ** ، حيث كل جانب يحاول القضاء على جزء من تاريخ المدينة والذي يعتبره فترة يجب نسيانها لما تتميز به من فترات وحقائق سيئة. الهجوم على قلعة حلب (Gonella, 2008) وتدمير مدخلها، هدف الثوار كان حذف صورة السلطة والدكتاتورية للحكومة السورية ، وتمثل دراسة الحالة الرئيسية لفكرة التدمير الرمزي. حيث قام المتمردون بإلحاق أضرار بجزء من الصرح المعماري لأنه يمثل قاعدة عسكرية اعتادت القوات الوطنية على استخدامها بدلا من اعتبارها واحدة من أهم صروح العمارة العربية الدفاعية. هذه الحقيقة تشكل عنصراً قد يشهد كيف أن أسباب الصراع قد تجاوزت بالفعل الاسباب الثقافية والتاريخية ، وإلى اي نقطة كل الاطراف جاهزون للوصول وما هم مستعدون للتضحية به للدفاع عن دوافعهم. هذا الموقف يتعلق بالطرفين ، في الواقع ، من ناحية أخرى دمرت القوات الحكومية أي رمز أو موقع يمكن أن يشكل في المستقبل دليلاً على ماحدث أو تمجد أفعال النشطاء. هذا السبب يحول المجموعة المثالية التي نبحثها ويتم توسيع معناها: إذا تمت الإشارة إلى المثال الأول "**إنكار التاريخ**" على أنه الرغبة في تدمير رموز الماضي ، يتركز موقف الجيش الوطني على حذف رموز المستقبل ، أو أي شيء قد يشكل دليلاً على ما يحدث الآن. هذه الميول حثت أهالي حلب على محاولة القيام بشيء ما لحماية رمز مدينتهم **القلعة** ، خاصة بعد استخدام تقنية الأنفاق المتفجرة لتدمير المبنى التاريخي للمستشفى الوطني ، وقصر المحافظة أمام القلعة مباشرة. هذه الحقائق هي مصدر مبادرة شعبية تضم الكثير من مواطني حلب لحماية المشهد العمراني. بدأ المواطنون حملة على مواقع التواصل الاجتماعي تسمى "أنقذوا حلب" بقناعة تنبيه جميع وسائل الإعلام وكل الناس لاجل حماية التراث وإنشاء شبكة "المراقبة المدنية" على الآثار.

بشكل عام ، تلك الأسباب الأربعة وآثارها ، أعطت شعوراً لأهل حلب بأنه يتم استهداف هويتهم ، ويتم إجراء تدمير منهجي لمدينتهم وتراثهم ، من أجل هزيمة شعورهم بالانتماء والفخر ، كعقوبة شخصية لسلوكهم خلال سنوات الصراع(Hreitani, 2013) . إضافة إلى ذلك الشعور بالمؤامرة الدولية (إما بالمشاركة في ذلك التدمير أو الإهمال وسياسة عدم الفعل) سائد في الآونة الأخيرة بين مواطني حلب: هدف تلك البلدان هو سرقة القطع الأثرية الخاصة بهم ، وتجريدهم من تاريخهم لإظهار ذلك المجتمع كمجتمع غير متحضر ووحشي. قالت إيرينا بوكوفا ، المديرة العامة لليونسكو (URL-3) ، "ضرر التراث الثقافي صفعة ضد هوية وتاريخ الشعب السوري. إنها ضربة ضد التراث العالمي للإنسانية ». هذه الكلمات ، تظهر الاهتمام والقلق الذي عبر عنه خبراء دوليين ، حتى لو لم يتبع دعمهم إجراء ملموس على المواقع المتضررة.

حتى إذا كان النزاع الآن لا يسمح ببدء خطة إعادة الإعمار / الحفظ العامة (باستخدام فكرة صانعي القرار في حلب لإعادة بناء كل شيء كما كان قبل الصراع) يبدو من المهم تحليل عدد قليل من الحالات الدراسية ، من أجل فهم تعقيد المشكلة وخصوصياتها ، وهي كذلك ضرورية لاقتراح استراتيجيات مختلفة للتدخل المستقبلي أيضًا. مع هذه الاقتراحات ينبغي احتضان الخبرات والمعارف الدولية المختلفة لتعمل كدليل إرشادي لخطة إعادة الإعمار.

الحالات الدراسية

تم اختيار الأمثلة والحالات المذكورة أعلاه اعتمادًا على رمزيتها وما تعنيه لمواطني حلب. لتحقيق هدف قياس التأثير الذي تقترحه الدراسة ، نقترح استغلال العديد من الأدوات المختلفة المفيدة لتقييم أهمية كل صرح ، مثل منهجيات هندسة القيمة، دلفي او منهجية تحليل الاثر المتبادل (Cross Impact Analysis) .مع ذلك ، يتم التفكير في هذه المنهجيات لـ "وقت السلم" ، ويشكل تطبيقها أثناء النزاع نقطة انطلاق صعبة للبحث. لذلك ، تقترح الورقة تكوين تحليل جديد ، اعتمادًا على أداة جديدة ناشئة قد تكون مفيدة في جمع البيانات وتعطي تلميحًا حول الوضع وتأثيرات تدمير التراث على مشاعر الناس. استخدام أداة جديدة واستراتيجية جديدة يعني قياس تفاعل الأشخاص من خلال الويب وخاصة وسائل التواصل الاجتماعي (مثل Facebookأو Twitter) والمواقع الإلكترونية وعدد الصفحات وعلامات التصنيف(الهاشتاج) حول نصب أو حدث واحد فيالصراع السوري الممتد لفترة طويلة(URL-4). قد تكون البيانات الناتجة عن هذه التحليلات مفيدة في تحديد مستقبل استراتيجيات إعادة الإعمار والتدخل لفهم القيمة الحقيقية لكل صرح وبناء وذلك لتحديد الأولويات قبل اتخاذ القرار بشأن أفضل منهجية للتدخل في كل موقع منها. من المهم الجمع بين هذه الأدوات لابتكار أداة حديثة مناسبة تاخذ بعين الاعتبار جميع المعايير والعوامل قبل التخطيط لاستراتيجية التدخل المستقبلي. في هذه الورقة، يهدف البحث إلى تقديم عدد قليل فقط من دراسات الحالة المختارة ، من أجل شرح كل مجموعة مصنفة: لكل واحد منهم ، ستعطي الدراسة الحالية تفسيرًا وتحدد رابطا عاطفيًا رمزيًا لكل صرح ناتجا من تحليل البيانات ، واقتراح للتدخل المستقبلي على التراث ، بهدف الحفاظ على الذاكرة والقيم الثقافية للموقع.

قيمة الحالات الدراسية وأهميتها

لأسباب الإيجاز ، تقدم الدراسة دراسات الحالة (المختارة كما هو مذكور من قبل) بنفس الترتيب كما تم اقتباسها من قبل. في الواقع ، سبب الضرر لا يزال يمثل نقطة البداية لأي تقييم واقعي أو لتشكيل أي اقتراح أو إرشادات للتدخل المستقبلي.

يعود **البازار الرئيسي-** (السوق المغطى) (Chibli, 2000) إلى القرن الرابع الميلادي حيث شيدت المحلات التجارية
على جانبي الشارع المستقيم بين بوابة أنطاكيا وقلعة حلب. بجانب تاريخها أهميتها ، لها قيمة تجارية منذ أن أصبحت السوق الرئيسي- في حلب ، كانت قد أحرقت في القرن الثامن عشر- خلال الإمبراطورية العثمانية. البضائع المباعة في هذه الأسواق في الماضي (Cantacuzino, 1984) لا تمثل أهمية السوق الرئيسية الوحيدة: في الأيام الأخيرة ، كانت المورد الرئيسي- لبضائع مدينة حلب وضواحيها وحتى مدن الرقة ودير الزور في الشرق واللاذقية وإدلب في الغرب. يتم تعزيز أهمية السوق من خلال وجود وروعة مبانيه التراثية (خانات ، مساجد ، مآذن ، تكايا) وهي مباني خاصة وفريدة من نوعها.

بني عام1916 (Mobaiyed, 2007) ، كان الصرح العثماني المتأخر يضم **بلدية مدينة حلب** (مبنى البلدية). إنها واحدة من العديد من المباني الجميلة من الفترة العثمانية المتأخرة التي تحيط بالقلعة ، شيدت مع تاثيرات اوروبية معمارية واضحة للعيان . الواجهة مليئة بالزخارف بإفريز ، ومدخل رائع مع ساعة فوقه.

السلالم الحجرية المجنحة والشكل المدمج جعلها نموذجًا فريدًا للعمارة في حلب في هذا العصر- لفترة من الوقت كان مبنى البلدية يضم مكتب الجوازات والهجرة في حلب- حيث اصطف السائحون ذات مرة لتمديد تأشيراتهم. انتقل مكتب الجوازات إلى مكان آخر ، وترك المبنى شاغراً بانتظار ترميمه. لكن لسوء الحظ تضرر بشدة في سبتمبر 2012 أثناء النزاع.

قلعة حلب هي قلعة محصنة كبيرة من العصور الوسطى في وسط مدينة حلب القديمة. تعتبر من أقدم وأكبر القلاع في العالم(Bianca, 2007). يعود تاريخ إستعمال تل القلعة إلى منتصف الألفية الثالثة قبل الميلاد على الأقل. في وقت لاحق كان احتلتها العديد من الحضارات منها الإغريق والبيزنطيين والأيوبيين والمماليك(Qudsi, 1984) . يُعتقد أن معظم البناء على ما هو عليه اليوم نشأ من العصر الأيوبي.

تم إجراء أعمال الترميم واسعة النطاق في العقد الماضي من قبل صندوق الآغا خان للثقافة بالتعاون مع جمعية آثار حلب (Jodidio, 2011). بجانب معمارها الاستثنائي والقيمة التاريخية ، لها قيمة رمزية لأهل حلب ، فهي رمز مدينتهم وتقريبًا تتواجد في كل شعار هناك. كانت المنطقة المحيطة بالقلعة من أكثر المناطق نشاطًا ، ليس فقط بالنسبة للسياح ولكن أيضًا لسكان المدينة. كانت الساحة الرئيسية أمام القلعة مسرحًا للعديد من الكرنفالات والأنشطة الثقافية ، كما كانت محاطة بالمقاهي الثقافية والمطاعم والمراكز الترفيهية.

بالنسبة إلى **الجامع الأموي** ومئذنته (Tabaa, 1997) ، قالت هلجا سيدن ، أستاذ علم الآثار في الجامعة الأمريكية في بيروت عن تفجير مئذنة الجامع "هذا مثل تفجير تاج محل أو تدمير الأكروبوليس في أثينا. هذا المسجد هو مثال حي لتراث المنطقة. هذه كارثة. من ناحية التراث ، هذا أسوأ ما رأيته في سوريا. أنا مصدومة" (URL-5) . هيكل المئذنة ، والمرتفع من السقف المسطح لإحدى القاعات ، يتكون من خمسة مستويات مع قمة متوجة محاطة بدائرة مع شرفة. كان هناك إفريز على طراز المقرنصات يفصل قمة الشرفة عن الهيكل. كان الهيكل مزخرفا بشكل كثيف بالنقوش البارزة ، أكثر من أي مئذنة.

هيكل آخر من العصر الإسلامي في حلب. احتوت قصصها على أقواس متعرجة وخطوط مستمرة. وفقًا لبريل في موسوعة بريل الأولى للإسلام " (Houtsma, 1987)كانت المئذنة فريدة من نوعها في العمارة الإسلامية بأكملها "وصف عالم الآثار إرنست هرتسفيلد النمط المعماري للمئذنة على أنها "نتاج حضارة البحر الأبيض المتوسط" وواجهاتها الأربع حملت عناصر انتقلت الى العمارة القوطية. جاءت قيمة المئذنة من القيمة الضخمة للمسجد نفسه ، وبعد الترميم في عام 2007 مع المناقشات الكبيرة بين الخبراء؛ كان له قيمة علمية لخبراء الترميم في سوريا كمحاولة تجريبية من قبل الخبراء المحليين. القيمة الضخمة المضافة إلى المئذنة جاءت بعد تعرضها للهجوم الأول أثناء النزاع ، وكان حزنًا شديدًا والاسى بعد ذلك عندما قصفت ودمرت تماما.

النتائج

كل هذه االصروح في خطر الآن ، نقترح اعتماد استراتيجيات موجهة ومستوحاة من خبرة دولية سابقة. بدءاً من رفض فكرة إعادة بناء التراث تماما كما كان قبل الصراع وابتكار حلول أخرى مقارنة بالحالات الدولية المماثلة.

تهدف الإستراتيجية الأولى **(تخليد الذكرى)** إلى الحفاظ على الأنقاض كذكرى للماضي وترك الصرح كما كان بعد الدمار (Gizzi, 2008)وتحيط به حديقة تذكارية والتي تركز وتوضح اكثر أهمية ذلك الصرح وتذكر الأجيال القادمة بمأساة الصراع. كمثال حالة A-Dome في هيروشيما ، تمثل نموذجا مثاليًا لهذه الاستراتيجية ، حيث تحافظ على أنقاض صروح المدينة الرئيسية وسط حديقة جديدة مصممة لإشراك السكان والسياح بتجربة وفهم الماضي(Morezzi, 2008).

حل آخر هو(**المزج**) ، يهدف إلى مزج احتياجات الحفظ مع الإرادة لإعادة تعريف التراث من خلال التقنيات الجديدة ، تهدف إلى استكمال الآثار المهدمة بمواد جديدة تظهر لقاء أسلوبين وعصرين. على سبيل المثال ، حالة الرايخستاغ المعروفة عالميًا في برلين (Casiello, 2011) تمثل تحفة

نموذجية من هذا الحل ، والوصول إلى الهدف المتمثل في إضافة النصب الأصلي المتضرر (البرلمان الألماني القديم) إلى التقنيات والمواد الجديدة (قبة جديدة مصـــنوعة من الزجاج و الصـــلب مع تقنيات طاقة متجددة) مع إضافة قيم رمزية (شفافية السقف ، مؤسسات نظيفة).

على الرغم من ان الدراسة قد اوضحت بالفعل كيف أن إعادة الإعمار الكاملة **لجميع** التراث المهدم تشـــير إلى نقص في الأفكار والمبادئ التوجيهية ، فمن الممكن التفكير بإمكانية إعادة بناء جزء من التراث المتضـــرر(Pane, 1959). هذا المؤشر **(إعادة البناء)** يطمح إلى تجاوز مأســـاة الماضي عبر إعادة بناء رموز الماضي. جسرـ موســـتار ، على ســـبيل المثال ، يمثل محاولة إعادة بناء ليس فقط للتراث المفقود ، ولكن أيضًـا لإعادة صـياغة ثقافة الماضي (التي دمرت في ذلك الوقت من خلال ما يسمى urbicide (مجزرة المدينة)، والتي تحذف جميع قيم ورموز الثقافة) (Safier, 2001) .

أخيرًا ، الاحتمال الأخير لـــلتدخل في التراث المتضرر يتمثل في الإرادة لحذف الماضي من خلال بناء آثار جديدة للمســـتقبل. هذا الموقف (**التصـــميم**) ، حتى لو كان مرتبطًا في الغالب بضـــعف إحياء ذكرى الصروح ، يشير إلى خلق مستقبل جديد ، والبناء على أنقاض التراث المتضرر و المفقود. مركز التجارة العالمي في نيويورك على سبيل المثال ، يشكل رمزًا لهذا التوجه ، اختيار انشاء مبنى جديد في نفس المنطقة ، يتميز بطراز وشكل ومواد بناء جديدة(Agnolotto, 2004) . حتى لو تم تخصيص المشـروع بمسـاحة مخصـصـة لذكرى الهجوم الإرهابي، فهذا قد يشـير إلى الإرادة لرفض الماضي وتجاوز المأساة.

توضح هذه الأمثلة أهمية التجربة الدولية وإسهامها في مستقبل التدخل في حلب بعد الصراع. من المهم أن نبدأ نقاش في أقرب وقت ممكن ، بين الخبراء الدوليون حول أفضـــل طريقة لمســـاعدة الخبراء المحليين وصـناع القرار على شرح كيفية التصرـف بعد انتهاء الصرـاع بدلاً من انتظار نهايته فعليا. قد تغير هذه الاسـتراتيجيات الفكر المنتشرـ و السـائد الآن في سـوريا **(لا تغفر أبدا ، لا تنسىـ أبدا)** وتستبدلها بفكرة جديدة للتدخل في تراث حلب (**سامح ولكن لا تنسى**) ، من خلال الجمع بين ذكريات الماضي مع ذكريات الصراع وذلك لبناء مستقبل جديد للأجيال القادمة.

المراجع

Abdulkarim, M. (2013). *The Archaeological Heritage in Syria during the Crisis, General.* Directorate of Antiquities & Museums, p. 42, https://unesdoc.unesco.org/ark:/48223/pf0000366848

Agnoletto, M. (2004). *Groundzero.exe. Costruire il vuoto.* Edizione italiana ed inglese, Kappa.

Bianca, S. (2007). *Medieval Citadels Between East and West.* Aga Khan Trust for Culture, p.65. ISBN: 8842214493

Cantacuzino, S. (1984). Aleppo: Bab El Faraj. *Mimar* (12), 24-28. https://www.archnet.org/publications/2866

Casiello, S. (2011). *I ruderi e la guerra. Memoria, ricostruzioni, restauri.* Nardini. ISBN: 9788840441979

Chibli, M. (2000). The City of Aleppo: Room for Rehabilitation. *Medina*, (11), 52-53. https://www.archnet.org/publications/3366

Gizzi, S. (2008). *Il vuoto e il suo contrario nella progettazione architettonica e nel restauro.* Topos e Progetto, 69-88.

Gonnella, J. (2008). *The Citadel of Aleppo: Description, History, Site Plan and Visitor Tour (2nd Ed).* Aga Khan Trust for Culture and the Syrian Directorate, General of Antiquities and Museums. p. 45-52, ISBN: 978-2-940212-02-6. https://akdn.imgix.net/53832/1641875825-2008_aktc_aleppo.pdf

Houtsma, M.T. (1987). *First Encyclopaedia of Islam.* E.J. Brill's.

Hrietani, M. (2013). *Public presentation "Challenges for Old City of Aleppo in the time of war" at Aleppo University.* 21th March 2013.

Jodidio, P. (2011). *The Aga Khan Historic Cities Programme, Strategies for urban regeneration.* Prestel. ISBN: 978-3-7913-4406-5 http://archnet.org/system/publications/contents/6721/original/DPC3576.pdf?1384801256

Mobaiyed, A.R. (2007). *Aleppo monuments (in Arabic).* Ministry of culture.

Morezzi, E. (2008) - Roberto Pane e l'istanza psicologica: sviluppi di un concetto nel caso-studio di Hiroshima. In S. Casiello and V. Russo (Eds.), *Roberto Pane tra storia e restauro: architettura, citta, paesaggio* (pp. 282-277). https://www.academia.edu/5378058/Roberto_Pane_tra_storia_e_restauro_Architettura_citt%C3%A0_paesaggio_a_cura_di_S_Casiello_A_Pane_V_Russo_Atti_del_Convegno_Nazionale_di_Studi_Napoli_27_28_ottobre_2

008_Marsilio_Venezia_2010_ISBN_978_88_317_0633_9_editor_with_S_Casiello_and_V_Russo_

Pane, R. (1959). *Città antiche. edilizia nuova.* Napoli: Edizioni scientifiche italiane.

Safier, M. (2001). Cities Under Siege: September 11th and after. *City*, 5(3), 383. DOI: 10.1080/13604810120105000

Qudsi, A. (1984). Aleppo: A Struggle for Conservation, *Mimar,* (12), 67-70. https://www.archnet.org/publications/2865

Tabaa, Y. (1997). *Constructions of power and piety in medieval Aleppo.* Penn State Press. ISBN: 978-0271015620

URL-1. Heritage for Peace (2022, Nov 24). *Heritage for Peace.* Heritageforpeace, Retrieved November 24, 2022, from http://www.heritageforpeace.org/

URL-2. Forum of Ummah Issues and Current Events (2014, Apr 1). *The demolition of graves and shrines is no longer monopolized by ISIS, Al-Nusra Front is organizing the campaign.* Retrieved July 7, 2014, from http://www.tajdeed.org.uk/ar/posts/list/9888.page , Accessible now via: https://web.archive.org/web/*/http://www.tajdeed.org.uk:80/ar/posts/list/9888.page*

URL 3. Alice Speri (2014, Mar 15). *Syria's Cultural Heritage Is a Major Victim of the Country's Civil War.* Vice. Retrieved November 24, 2022, from https://news.vice.com/article/syria-s-cultural-heritage-is-a-major-victim-of-the-country-s-civil-war

URL-4. United States Institute of Peace (2013, May 17). *Google, Facebook, Microsoft Eye Syria Social Media Data for Trends.* USIP. Retrieved November 24, 2022, from http://www.usip.org/olivebranch/google-facebook-microsoft-eye-syria-social-media-data-trends

URL-5. Leon Watson (2013, Apr 25). *This is like blowing up the Taj Mahal': Fierce fighting reduces iconic 11th-century minaret at Syria mosque to rubble.* Dailymail. Retrieved November 24, 2022, from https://www.dailymail.co.uk/news/article-2314459/Umayyad-Mosque-Archaeologists-left-horrified-historic-11th-century-minaret-reduced-rubble.html#ixzz34GP2SvGD