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Endangered Mosque Heritage in Nakhchivan: Architectural Documentation and Conservation Priorities

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Abstract

Historical monuments constitute valuable records of cultural heritage and collective memory. This study examines selected religious architectural monuments in the Nakhchivan region, focusing on mosques and shrines, to document their current preservation status and to underline the necessity of timely conservation action. Using a descriptive and comparative approach grounded in field observation and architectural analysis, the research compiles basic identification data and evaluates physical condition with particular attention to roof integrity, structural continuity, and the survival of key heritage elements. Findings indicate that several monuments located in the Kangarli and Sharur districts are in a critical state of deterioration. In particular, the Old Khok Mosque (Kangarli) and the mosques in Kurchulu and Ashagi Aralıq villages (Sharur) have largely collapsed, with only structural remnants remaining, signalling an urgent need for protective measures and systematic documentation. Given their historical and architectural significance, these monuments require professionally supervised, scientifically informed conservation-restoration planning. Accordingly, the study emphasizes that relevant institutions should prioritize immediate interventions to prevent further loss and to safeguard this heritage for future generations.

Keywords: Cultural Heritage, Mosques, Nakhchivan, Protection of Monuments, Public Awareness, Shrines.

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INTRODUCTION

The President of the Republic of Azerbaijan, has always kept the study of Azerbaijan historical and cultural monuments at the center of attention (Əliyev, 2008). The study of Nakhchivan's national architectural monuments are also relevant and highly significant from the perspective of the statehood concept of the Republic of Azerbaijan. Researching the examples of religious architecture located in the Nakhchivan region is of particular importance for understanding the developmental stages and regional characteristics of Azerbaijani architectural history. Considering that a large part of them are not preserved, uncontrolled, and unexplored, many of these monuments are already on the verge of disappearance. The preservation of architectural heritage, which embodies a part of Azerbaijan history, has been one of the crucial issues facing our state (Şəxizadə, 2023). During the Soviet period, the improper use of religious architectural monuments and the insufficient attention to their preservation, as well as the lack of scientifically grounded restoration projects (Məmmədova, 2007; Саламзаде, 1978), led to the erosion and destruction of Azerbaijan historical and cultural monuments. The national leader of the Azerbaijani people, Haydar Aliyev, always valued architectural monuments and emphasized the importance of their preservation (Məmmədova, 2023). In a speech in 1999, Haydar Aliyev stated: "What pains me is that Azerbaijani people, despite their rich history, rich culture, and deep historical roots, were unable to show it first to their own nation, and second to the world, both in previous centuries and later, including in the 20th century" (Əliyev, 2002).

Azerbaijan's rich historical and cultural heritage is not only the memory of the past but also one of the foundational pillars of national identity. Preserving this heritage and passing it on to future generations is a serious responsibility for every citizen and, collectively, for the state. Azerbaijan's historical monuments, especially religious sites such as mosques and shrines, are not only architectural examples but also living carriers of Azerbaijani history. From this perspective, Azerbaijani people must first properly understand their history and cultural heritage and recognize the importance of safeguarding it. Monuments that are deteriorating or being destroyed due to neglect may be irreversibly lost over time. This would result in a void in national memory. Therefore, the protection and study of historical monuments should be considered not only a cultural activity but also a task of strategic importance. The great leader Haydar Aliyev repeatedly emphasized the significance of this issue in his speeches and meetings with scholars and cultural figures, highlighting the necessity of studying and preserving historical and cultural heritage within the framework of a national concept. This approach exemplifies seeing history not merely as traces of the past but as the foundation of the future. Research shows that the territory of the Republic of Azerbaijan is rich in historical and cultural monuments (Şəxizadə, 2023). In particular, the Nakhchivan region is a historical land. The historical monuments there, especially mosques and shrines, play a particularly important role. Each of them tells a story about Azerbaijan history. Some of these monuments have completely collapsed over time, while others remain in a neglected state. Concrete and prompt measures must be taken both to re-examine the destroyed ones and to preserve those that still exist. The current situation requires that the approach to religious and historical monuments be not formal but scientifically grounded and result-oriented. The sustainable preservation of historical heritage reflects not only the past eras but also today's collective national interest. If we do not take measures today to maintain these monuments, tomorrow we may be forced to know them only from archival documents.

Medieval sources provide certain information about the cities of Azerbaijan and their magnificent architectural monuments (Vəlixanlı, 1974; Амензаде, 2019). Medieval authors also provided information about the architectural monuments of Nakhchivan (Çələbi, 1997). The fact that the city of Nakhchivan is referred to as "Naqshi-Jahan" in medieval sources is also related to its famous architectural monuments (Məmmədov, 1977; Məmmədova, 2008). Nakhchivan's role as an important political center of both the Atabegs and the Ilkhanids was one of the main reasons for its socio-economic development. Information about Nakhchivan's architectural monuments can be found in the works of O. Çelebi (Çələbi, 1989), J. Charden (Şarden, 1994), I. Schopen, A. Veernitsky, and others (Quluzadə, 2023). The written accounts, photographs, and plans provided by our esteemed scholars and travellers are valuable sources for the study of Nakhchivan architecture. However, it should be noted that these materials are not entirely sufficient for a comprehensive study of Nakhchivan's architecture. The architectural history of Nakhchivan is rich and full of valuable monuments. The fact that some of Nakhchivan historical architectural monuments have not been preserved to the present day, while others are under threat of destruction, underscores the importance of safeguarding this architectural heritage.

The aim of this study is to examine the religious architectural monuments of the Nakhchivan region, to identify their historical and architectural features, and to evaluate their preservation status. The research focuses on selected mosques and shrines within Nakhchivan and considers them in their historical and regional context. The study is based on the analysis of written sources, archival materials, and existing scholarly literature, supported by comparative and descriptive methods. The originality of the research lies in its systematic approach to Nakhchivan's religious architecture and in drawing attention to monuments that are either insufficiently studied or face the risk of disappearance.

LITERATURE REVIEW

Religious Architecture in Nakhchivan (Historical Context and Typology)

Architecture in Nakhchivan developed during the medieval period and following the adoption of Islam, acquired distinctive characteristics. After the Republic of Azerbaijan gained independence, favourable conditions were created for the development of architecture, as in other fields of Azerbaijan science. Research conducted in the territory of the Nakhchivan Autonomous Republic revealed that the region is even richer in architectural monuments, and new architectural sites were identified. Nakhchivan's religious architecture is of considerable importance for Azerbaijan architecture as a whole. The architectural monuments of Nakhchivan have always attracted the attention of travellers and researchers visiting the region, who have provided accounts and descriptions of them. A significant group of Nakhchivan's architectural monuments consists of mosques and pilgrimage sites. Medieval authors also provided information on the religious architectural monuments of Nakhchivan.

In his book published in 1882, K. A. Nikitin provided information about the Mausoleum of Noah and recorded noteworthy facts regarding its architecture. In addition, the works of V. M. Sysoyev contain important information on the religious architecture of Nakhchivan. V. M. Sysoyev revealed significant facts about the Venand Juma Mosque, the Ordubad Juma Mosque, the Nakhchivan Juma Mosque, as well as numerous neighborhood mosques and pilgrimage sites in Nakhchivan. The studies on Nakhchivan architecture authored by Ə. V. Salamzadə and K. Məmmədzadə are also of great importance. The information they presented and the architectural plans they produced are highly valuable for the study of Nakhchivan architecture.

Conservation Approaches for Mosque and Shrine Heritage

Contemporary conservation theory considers the preservation of historical materials, the conduct of documentation, and the scientific justification of interventions as fundamental principles (Jokilehto, 1999). From this perspective, any restoration process should be accompanied by preliminary research and historical-structural analysis.

The preservation of mosques and shrines, and their proper execution, is one of the important issues. In this regard, it can be said that these cultural objects are often repaired or restored through personal initiatives. Although such restoration work, conducted outside of professional expertise, aims to improve the monuments, it often leads to both the loss of their historical value and a reduction in their lifespan. This, in turn, accelerates the deterioration of the monuments. During such restoration and repair work, the architectural features of mosques and shrines are often neglected, and their appearance is almost entirely altered. Random and unprofessional interventions, coupled with insufficient knowledge about the monument, can significantly change its historical and architectural characteristics. Of course, alongside the incorrect practice of restoring mosques and shrines through individual initiative, although the restoration of many architectural monuments is carried out at the state level, the self-directed actions of unskilled specialists have caused considerable harm to these monuments. The elements that suffer the most damage during the restoration of mosques and shrines are their mihrabs. Recently, mihrabs distinguished by specific architectural styles have been dismantled and replaced with mihrabs made of furniture materials, or, as in the case of the Ordubad Juma Mosque, covered with tiles. Mihrabs made of furniture materials can be found in the Dəstə Juma Mosque, the Vənənd Juma Mosque, and the Burcunu Mosque in Vənənd (Figure 1). Mihrabs, one of the most important architectural elements of mosques, were originally constructed with great delicacy and thoughtfulness, featuring intricate patterns, motifs, and inscriptions. In this regard, the Ordubad Juma Mosque in the Ordubad region, dating back to the 17th century, which is considered one of the architectural jewels of the region, can be cited as a significant example.

Figure 1. Mihrabs; 1- Vənənd Mosque (former); 2- Vənənd Mosque (current); 3- Burcunu Mosque (author's archive).



The lack of supervision by specialists over the restoration and repair work of Azerbaijan architectural monuments, including mosques and shrines, as well as the absence of a unified concept regarding restoration and repair activities, creates certain problems in the preservation of these monuments. This situation leads to the restoration of architectural monuments through personal initiatives and by non-professional specialists, which can result in their distortion or even destruction, an outcome that must be strictly prevented.

The determination of an object's "cultural significance" is considered a crucial step in the adoption of conservation decisions. This concept is systematically presented in the Burra Charter. According to the Burra Charter, the conservation process should begin with an analysis of the cultural value of the site, and all

interventions must serve to preserve that value (Australia ICOMOS, 2013). Prior to initiating the conservation of mosques and shrines in the significance of the area and its architectural characteristics should be thoroughly examined. The Nakhchivan architectural school is extensive, and each region and historical period exhibits distinctive features in terms of the spatial and volumetric organization as well as the structural elements of architectural monuments. Moreover, the mosques and shrines under study span the XIV–XIX centuries.

According to Feilden, interventions must ensure structural stability, new materials should be compatible with the existing ones, and, where possible, possess a reversible character (Feilden, 2003). This principle guarantees that the monument is preserved as a documented record for future generations. During the restoration process, the original condition of the monument and the materials used must be thoroughly investigated. In particular, the existing materials should be analysed in a laboratory setting to determine their composition and physico-chemical properties. Based on these studies, analogues with the same composition and characteristics should be prepared. If this is not possible, alternative materials that closely match the original should be employed. The Old Khok Mosque, Kurchulu Mosque, and Aşağı Aralıq Mosque have undergone some degree of alteration over time; however, a significant portion of their original fabric has been preserved. By scientifically analysing the original materials of these monuments, their restoration can be carried out as closely as possible to the original condition through the use of materials with similar properties. Interventions carried out without taking into account the specific characteristics of Islamic architectural heritage can damage the semantic and functional integrity of the monument. In Islamic architecture, form and space are not merely aesthetic categories but also play a crucial role in organizing religious functions (Hillenbrand, 1994). Therefore, during the conservation of mosques, the spatial layout, orientation for prayer, and hierarchical organization of spaces must be preserved. Furthermore, the social and community aspects hold particular significance in the conservation of religious heritage sites. In religious buildings, conservation is not limited to physical interventions but also encompasses strategies for continued use and community integration (Orbaşlı, 2008).

MATERIALS AND METHODS

Some of the mosques and pilgrimage sites located in the Nakhchivan region have been destroyed, while others are under threat of deterioration. Although a large number of the mentioned mosques and shrines have been ruined, it is still possible to identify and describe their original spatial layouts and architectural characteristics. The selected historical religious monuments are similar to one another in terms of architectural design typical of the periods in which they were constructed. Another common feature of these mosques is that all three are located in the Sharur District. Furthermore, the pilgrimage sites mentioned have largely remained outside the focus of scholarly research to the present day.

Both the Seyidlar Pir and the Kilit Pir constitute architectural complexes. Specifically, the Seyidlar Pir consists of three separate buildings, whereas the Kilit Pir is composed of two buildings. The Seyidlar Pir complex includes two shrine structures and one rectangular-plan mosque. The Kilit Pir complex, in contrast, comprises one shrine building and one mosque structure.

To establish a structured basis for assessment, this study focuses on a selected set of mosques and pilgrimage shrines located in different districts of the Nakhchivan Autonomous Republic. The cases were chosen to represent diverse religious

building types (mosque, pir, and pilgrimage complex), varying chronological ranges (16th–19th centuries), and differing levels of physical deterioration, including severely ruined examples. For each case, basic identification data (name, approximate dating, and location) were compiled together with visual documentation obtained during field recording. The resulting inventory is presented in Table 1, which summarizes the case studies and provides the corresponding figure references used throughout the findings section.

Table 1. Inventory of Case Studies (Basic Information and Visual Documentation).

No.	Site name	Building type	Dating / construction period	Location (District–Settlement)	Documentation year (photos)	Figure	Basis for dating (as stated in the text)
1	Vanand mosque	Mosque	14 th century	Ordubad District-Vanand Village	2025 (specified)	1	The colorful decorative elements on the mihrab and the architectural features characteristic of the period
2	Old Xok Mosque	Mosque	18 th century	Kangarli District - Xok Village	2025 (specified)	2	Dating based on Arabic-script inscriptions above the entrance (construction and later repair inscriptions)
3	Kurchulu Mosque	Mosque	18 th century (initial); 20 th century (later additions)	Sharur District - Kurchulu Village	2025 (specified)	3	Architectural characteristics and collected information; periodisation of later brick annex
4	Aşağı Aralıq Mosque	Mosque	18 th -19 th centuries	Sharur District - Aşağı Aralıq Village	2025 (specified)	4	Estimated dating based on architectural features and construction techniques; local oral accounts as supporting evidence
5	Seyids Pir Complex	Shrine / pilgrimage complex	17 th -18 th centuries	Babek District - north of Göynük Village	2025 (specified)	5,6	General architectural characteristics and historical context; multiple restoration interventions noted
6	Kilit Pir	Shrine (pir)	16 th -17 th centuries	Ordubad District - south of Kilit Village	2025 (specified)	7,8	Archaeological observations and ceramic finds in the vicinity used as chronological evidence

RESULTS

General Findings on Mosques and Shrines (Common Patterns)

The field-based documentation and descriptive comparison of the selected mosques and shrines indicate several recurring patterns regarding both architectural characteristics and preservation conditions across the Nakhchivan region. First, the cases demonstrate the continuity of regional religious architecture from the late medieval period into the 18th-19th centuries, with modest scale structures that are closely integrated into rural settlement patterns. In terms of spatial organization, the investigated mosques are generally rectangular in plan and employ relatively simple volumetric compositions, while the shrines (pirs) and the pilgrimage complex display compact building forms with interior elements associated with ritual practice, such as graves, niches, and decorated wall surfaces.

A second common pattern concerns material use and construction logic. The surveyed monuments predominantly rely on locally available masonry materials—primarily stone, supplemented by baked bricks in specific components such as wall segments, window headers, or later annexes. This mixed-material practice is observed both as an original construction strategy and, in some cases, as evidence of subsequent additions. The remains of collapsed roofs and surviving structural traces further suggest the widespread use of timber elements in roof and ceiling systems in mosques, including wooden beams and, in some examples, wooden columns that once supported flat or near-flat ceiling structures. The continuity of this timber-supported interior tradition is also consistent with previously reported regional examples of wooden-column mosque construction dating to the 17th-18th centuries.

Third, and most critically, the documentation reveals a shared vulnerability of these monuments to accelerated deterioration when routine maintenance and professional supervision are absent. Across multiple cases, the most visible indicator of advanced decay is the loss of roof integrity, which initiates rapid structural degradation. Roof collapse is typically followed by progressive wall failures, loss of masonry fabric, and the disappearance of interior architectural elements. In the most severely affected examples, the monuments have reached a stage where only partial walls or foundation-level remains survive, indicating that the threshold for urgent intervention has already been exceeded.

Another consistent observation relates to the condition of architectural and epigraphic features that carry heritage value. In several cases, inscriptions, carved wooden elements, and architecturally distinctive components (notably mihrabs in mosques) represent key carriers of historical and artistic significance. However, these elements are also among the most exposed to loss—either through physical destruction caused by collapse and weathering, or through interventions that do not adequately respect the original material and design logic. In line with the issues highlighted in the literature, the findings suggest that unprofessional repair practices can lead to a reduction in authenticity, particularly when original features are replaced with incongruent materials or altered in form and surface treatment.

Finally, the cases collectively point to the need for a systematic, evidence-based approach to preservation that goes beyond isolated repair attempts. The current condition of the monuments demonstrates that both mosques and shrines require timely documentation, technical assessment, and prioritized conservation planning. In this context, the following subsections present the case-specific results by describing each monument's architectural characteristics, dating evidence as stated in the available records and observations, and the current state of preservation as documented in the field.

The Old Xok Mosque (Kangarli District): Architectural Features and Condition Assessment

The ancient mosque located in the northern part of Xok village in the Kangarli district stands out as one of the historical-religious buildings dating back to the 18th century (Figure 2). Although the mosque is currently in an unusable condition, it is possible to imagine its original appearance based on its architectural features and remaining elements. The building is rectangular in plan and constructed in an elongated form. The entrance of the mosque is located on the south side. The roof has completely collapsed. Based on the remaining construction elements, it can be said that the roof was supported by wooden beams, and the ceiling was held up by wooden columns. The courtyard of the mosque is surrounded by a stone wall. The walls are mainly built of stone, while some parts, particularly

certain sections of the walls and window headers, are constructed with baked bricks. The window headers are completed with semicircular arches. Above the entrance door, there are two inscriptions written in Arabic script. One of these inscriptions relates to the construction of the mosque, and the other to restoration work carried out at a later period. Based on the content of the inscriptions, it is determined that the mosque was built in the 18th century. Unfortunately, this historical site has not been preserved to the present day. Currently, only the ruins of the structure remain. Such monuments are part of our national heritage, and their loss would mean the erasure of our history. Therefore, it is essential to take ownership of the mosque and implement preservation measures before it is completely destroyed.



Figure 2. Ruined state of the Old Xok Mosque (author's archive).

Kurchulu Mosque (Sharur District): Architectural Features and Condition Assessment

The historical mosque located in Kurchulu village of the Sharur district was built in the central part of the village (Figure 3). The main part of the mosque has a rectangular form and is constructed from stone materials. In later periods, an additional auxiliary building with a rectangular plan, built from bricks, was added to the structure. Two entrance doors are located on the south wall of the main building. One of these doors was intended for male visitors, and the other for female visitors. The mihrab, positioned at the centre of the qibla wall, is designed as a rectangular niche and was used to indicate the direction of prayer. A part of the mosque's partition has survived relatively well to the present day. Based on the remaining elements of the mosque in its ruined state, it can be determined that the ceiling structure was supported by wooden columns. The capitals of these columns were also made of wood, with inscriptions carved on them. Inscriptions written in Arabic script can be observed on the capitals. Based on the obtained information and architectural features, it is possible to date the initial construction of the Kurchulu Mosque to the 18th century, while later modifications and additions belong to the 20th century. This indicates that the mosque was in use for a long period and underwent functional changes over time. The internal columns of the Kurchulu Mosque have a stepped structure, similar to those in the Qıxmırlı, Qurbanlı, Xanaga, Burcunu, and Yurdcu mosques. Overall, such wooden column constructions were commonly used in many mosques built between the 17th and 18th centuries (Bayramov, 2025).

Aşağı Aralıq Mosque (Sharur District): Architectural Features and Condition Assessment

The mosque is located in Aşağı Aralıq village of the Sharur district. The historic mosque has a rectangular plan and is constructed from stone materials. The entrance is situated on the eastern side. To the left of the entrance, a later-added auxiliary building made of bricks was constructed to serve additional needs. The structure has not survived intact to the present day. The mosque's roof has completely collapsed and fallen inward. The remains of the ruined roof



Figure 3. Ruined state of the Kurchulu Mosque;
1-Entrance, 2-Auxiliary building,
3-Mihrab (author's archive).

structure, particularly the wooden beam fragments, indicate that the roof was flat (Figure 4). The doors and windows of the building are rectangular in shape. Beneath each window, there are elongated rectangular niches. The mihrab, located on the south wall, is completely destroyed, and its original location can only be determined based on its contours. There are various oral traditions among the local population regarding the construction of the mosque. These traditions can be considered an important source that reflects the role of the architectural monument in society and the way it has been valued. Based on the architectural features and construction techniques, it is estimated that the mosque was built between the 18th and 19th centuries. Currently, only the ruins of this building remain. It is among the historical-religious monuments in need of preservation and is noteworthy as part of the national cultural heritage.



Figure 4. Ruined state of the Aşağı Aralıq Mosque (author's archive).

The Seyids Pir Complex (Babek District): Architectural Features and Condition Assessment

The Seyid Pir is a pilgrimage complex consisting of three structures built in close proximity to one another, located on a mountain slope to the north of Göynük village (Figure 5). The entrances of these structures face south, and their internal layout is organized in accordance with Islamic religious principles, featuring numerous burial sites. The interior wall surfaces are decorated with religious inscriptions, depictions associated with Islamic sacred figures, and

various illustrative elements with different narrative themes. The complex is not only a religious-functional space but also a sacred centre where significant rituals are performed within the belief system of the local population. Residents of surrounding villages visit this pir, offer sacrifices, and make vows there in the hope that their prayers will be fulfilled. Pilgrims customarily tie pieces of cloth and scarves of various colours to trees around the pir and to areas near the structures, symbolically expressing their wishes. In the northwestern part of the complex, there is also a small shrine with a rectangular plan, constructed by stacking natural rock fragments.



Figure 5. View of the three structures within the Seyids Pir Complex (author's archive).

This site, like the other structures, is associated with the tradition of pilgrimage. Existing ethnographic and architectural studies indicate that the structures forming the Seyids Pir Complex were built over the graves of sacred individuals and, in this respect, correspond to the classical concept of a pir. As the pir buildings have undergone multiple restorations, their exterior and interior appearances have been completely altered. The remains of an ancient Muslim cemetery located near the complex have survived to the present day, further reinforcing the religious and historical significance of the area. Based on its general architectural characteristics and historical context, the Seyids Pir may be dated to the 17th–18th centuries. The buildings within the pir have currently been reconstructed (Figure 6). During the renovation of the Seyids Pir in Göynük village of Babek District, restoration and repair works were carried out in a new style, without taking into account the original architectural style and construction materials of the shrines previously located there.



Figure 6. View of the three structures within the Seyids Pir Complex (author's archive).

The Kilit Pir (Ordubad District): Architectural Features and Condition Assessment

The Kilit Pir is located in a hilly area to the south of Kilid village, which is part of the Ordubad District of the Nakhchivan Autonomous Republic. The entrance of the monument is situated on the eastern side. The principal structure of the pir is a small building with a rectangular plan. Small rectangular niches set into the wall surfaces emphasize both the functional and decorative qualities of the space. The placement of lamps, presumed to date to the medieval period, within these niches indicates that religious ceremonies and pilgrimage rituals were conducted at the site. The grave located at the centre of the structure most likely belongs to an individual regarded as sacred and venerated by the local population. Archaeological observations carried out in the area revealed ceramic specimens of various forms and techniques around the pir (Figure 7). On the basis of these ceramic materials, the initial construction of the Kilit Pir is dated to the 16th–17th centuries. The uncovered materials provide valuable information about both the chronological framework of the monument and the religious-architectural traditions that existed in the region. In terms of both its architectural characteristics and functional purpose, the Kilit Pir is considered one of the typical representatives of medieval pilgrimage shrines in the Nakhchivan region (Figure 8). The hilly geographical setting in which it is located further enhances the shrine's spiritual and symbolic significance.



Figure 7. Interior of Kilit Pir (author's archive)



Figure 8. Exterior of Kilit Pir (author's archive).

Comparative Summary of Case Studies (Table-Based Comparison)

This subsection synthesizes the case-specific findings presented in Sections 4.2-4.6 and provides a comparative overview of the preservation status of the investigated mosques and shrines. To enable a consistent cross-case reading, the assessment focuses on observable indicators reported in the field documentation and descriptive analyses, including roof integrity, overall structural continuity, and the condition of key architectural and epigraphic elements (e.g., mihrabs, inscriptions, niches, and interior features). The resulting summary is presented in Table 2, which consolidates the principal condition characteristics of each monument and outlines the corresponding level of urgency for conservation action based on the current state described in this study.

This table provides a qualitative classification based on the field observations and descriptive architectural reading reported in the text; the "overall condition class" and "urgency level" assessments were determined primarily by considering roof integrity, structural continuity, and the preservation status of key heritage elements.

Table 2. Condition Assessment
Summary of the Investigated
Monuments.

No	Site	Building type	Roof condition	Wall / structural integrity	Key elements (mihrab / inscriptions / niches)	Evidence of later interventions	Overall condition class	Urgency level
1	Old Xok Mosque	Mosque	Completely collapsed	Only ruins remain; building is unusable	Two Arabic-script inscriptions above entrance (reported); interior elements largely lost	Not specified beyond inscription indicating later repair	Ruin / near-total loss	Immediate
2	Kurchulu Mosque	Mosque	Not preserved (ruined); original timber-supported ceiling inferred from remains	Substantial ruin: some interior partition survives relatively well	Mihrab described as rectangular niche (reported); wooden column capitals with Arabic inscriptions (reported)	Brick auxiliary annex added in later period (20 th c.)	Severely deteriorated / partial survival	Immediate
3	Aşaqı Aralıq Mosque	Mosque	Completely collapsed inward	Only ruins remain; major loss of fabric	Mihrab completely destroyed; niches below windows reported	Later-added brick auxiliary building	Ruin / near-total loss	Immediate
4	Seyids Pir Complex	Shrine / pilgrimage complex	Reconstructed (present condition not described as collapsed)	Buildings currently reconstructed; original fabric and appearance altered	Interior wall surfaces decorated with religious inscriptions and depictions (reported)	Multiple restorations; reconstruction in a new style not respecting original materials/style	Physically present but authenticity compromised	Short-term (documentation and conservation control)
5	Kiliti Pir	Shrine (pir)	Not reported as collapsed	Small rectangular structure; appears standing based on description	Wall niches: lamps presumed medieval; central grave (reported)	Not specified	Standin / requires monitoring	Mid-term (preventive conservation)

CONCLUSION

Research shows that the Nakhchivan region is rich in mosques and shrines. These religious architectural monuments provide insights into different pages of our history and demonstrate that, throughout various periods, architecture in Azerbaijan, including Nakhchivan, developed and acquired its own distinctive characteristics. As tangible records of cultural continuity, they also reveal how local building traditions and regional craftsmanship were shaped by historical, social, and environmental contexts over time. The various construction techniques and ornamental details employed in these religious monuments reflect the mastery of architectural practice and refined artistic taste of Azerbaijani people. In addition to their formal and material qualities, these buildings constitute an important documentary source for architectural historiography, particularly when considered together with their spatial organization, structural solutions, and surviving decorative elements.

The inscriptions preserved on these monuments are likewise of great value for studying architectural history and for tracing the social and political developments of the periods in which they were produced or later repaired. Such epigraphic evidence contributes not only to dating and attribution, but also to understanding patronage, restoration histories, and the cultural meanings attributed to these religious spaces. In this regard, the preservation of

mosques and shrines together with their architectural styles, patterns, material integrity, and inscriptions, is of critical importance. Ensuring the protection of these monuments and providing consistent professional supervision over them remains an essential task. Accordingly, the participation of qualified specialists, the adoption of a scientifically grounded approach, and compliance with relevant regulatory standards are necessary during any restoration and repair interventions in order to prevent irreversible loss of authenticity. Each of these historical monuments represents our past and our history; therefore, their disappearance or distortion would not only weaken the continuity of cultural memory, but also pose serious problems for our future.

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Triumphal Arches (Tak) Architecture as a Temporary Architectural Device: A Study on Early Republican Period in Turkey Examples

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Abstract

This article examines triumphal arches (TAK) erected on urban squares and main axes during the early Republican period in Turkey as ephemeral architectural elements, positioned between monument, gateway and decorative portal typologies. The conceptual framework is structured around ephemerality, monumentality, collective memory and nation-building, and interpreting these reads arches as both spatial interfaces and ideological communication devices. Methodologically, the study combines a literature review, archival documents, photographs and plan analyses; ceremonial arches in Istanbul, Ankara, Izmir, Adana, Zonguldak, Diyarbakir, Samsun and other cities are classified through a comparative analysis reading. Common formal features are evaluated under the headings of number of openings, vertical mass configuration, material and structure, colour and graphic language, and urban location. The findings indicate that Republican arches appropriate the archetypal scheme of ancient triumphal arches, yet translate discourses of modernization and national unity into space through the use of red-white colour codes, portraits of Atatürk, institutional emblems and numerical slogans. The article argues that these temporary yet highly representative installations should be documented and discussed as part of modern architectural heritage and reconsidered as an installation language that can inform contemporary urban design and commemorative practices.

Keywords: Collective Memory, Monumentality, Temporary Architecture, Triumphal Arch Architecture.

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THE CONCEPT OF THE TEMPORARY ARCHITECTURAL ELEMENT IN ARCHITECTURE

Beyond creating mere reference or meeting points through every architectural intervention that is attached to it, the city also fully mobilizes its capacity to represent the architectonic expression specific to its time. Through the act of construction, both the content that is defined and the mode of its communication reflect the prevailing assumptions of the society's system of values (Kolbay & Bursa, 2022). In the configuration of public space, the representations of these elements directly influence collective memory. They rewrite existing codes or add new ones, thereby shaping collective memory, while at the same time communicating as instruments of representation. In this context, Kolbay and Bursa (2022) interpret the term architectonic expression, based on its usage in the literature, as a sign of constructing the whole by emphasizing all structural values in a constructive and structural sense.

The role of the image in transmitting "emotion" within the urban memory is highly significant. The meaning encoded in the city's memory by a given architectural element, object, symbolic structure or image is expanded rather than narrowed as it intersects with the individual stories of the city's inhabitants, continuing without undergoing a fragmented transformation. Its position in memory is reinforced, its foundations become more deeply rooted, and, like the widening of a circle, the semantic field it encompasses expands, rewriting the codes. This process of rewriting is not a replacement of the existing codes, but rather their re-inscription in a way that preserves what already exists while incorporating broader, additional layers of meaning.

This new form of representation, which is integrated into social memory and carries emotional transmission, may materialize as an inscription, a totem, an obelisk, or a building. In Turkish societies and in Anatolia, the tradition of monuments grounded in commemorative rituals dates back to the Göktürk period. The Göktürks, also reflecting Shamanism, conveyed traces of the history of the Turkish language and art, and symbolized specific events or significant figures through balbals bearing inscriptions. In the Uighur period, another Turkish state, under the influence of Buddhism and nourished by Indian, Chinese and Hellenistic art, a more realistic mode of pictorial and sculptural expression was achieved. Monuments were produced for various purposes, ranging from everyday themes to the representation of religious rituals (Kolbay & Bursa, 2022), (Sözen, 1973). In Antiquity, obelisks and columns functioned as frequently used imagistic instruments; in Seljuk and Ottoman architecture, the search for a new monumental language distant from figurative abstraction led to the emergence of fountains, ablution fountains, and public buildings constructed for revival purposes as integrative architectural elements of squares.

In spaces designed within temporary settlements, the concepts of maximum mobility, freedom and flexibility come to the fore (Chappel, 2004). These structures are generally characterized by ease of construction without requiring high craftsmanship, the use of light and easily formable materials, and rapidly assembled structural systems. In this respect, in the historical context, temporary structures are primarily buildings made of local materials, used for a short period and designed to respond to basic needs (Gök & Erman, 2021). Such structures have been erected not only to create space, but also for symbolic occasions. Built for events with strongly symbolic meanings—such as coronations, victories, births, or weddings—these structures were dismantled after the ceremony, to be reassembled again when needed. Emerging with their symbolic monumental value, triumphal arches (tak) architecture have continued to exist in its modern usage as a temporary architectural element.

Temporariness in architecture is not merely the opposite of permanence; it is a design strategy that relies on time-bounded assembly, reversibility, and event-based performativity. Scholarship on portable and temporary building emphasizes demountability, mobility, and the capacity of short-lived structures to generate long-lived social effects (Kronenburg, 2008). Within urban studies, 'temporary urbanism' is discussed as a fourth dimension that reconfigures land, space, and meaning through interim uses and staged interventions (Bishop & Williams, 2012). Taking these perspectives together, this article reads early Republican taks as temporary architectural devices that compress political representation, urban choreography, and collective memory into a short time span.

CONCEPTUAL FRAMEWORK

This study approaches TAK architecture within the continuity of "passage/monument" that stretches from ancient triumphal arches to ceremonial arrangements of the early Republican period (1923–1938), and reads it through the tension between temporariness and monumentality. The elements attached to urban space are positioned not only as points of reference or landmarks, but also as imagistic interfaces that represent the architectonic expression and the value system of their time. While the notion of the temporary architectural element is commonly defined in the literature through mobility, flexibility, light structures and short-term use, this study considers taks not solely in relation to their physical lifespan, but in conjunction with their durability within collective memory. Built for rituals such as coronations, victories, births, marriages and national holidays, these structures continue to function in urban memory as instruments of emotional transmission and narrative production, even though they are dismantled once the ceremony is over.

The trajectory of the monumental tradition in Anatolia—from Göktürk balbals to Seljuk and Ottoman fountains and ablution fountains, and from there to the modern Republican taks—reveals a language whose form changes while its meaning remains continuous. The mode of representation established through obelisks and columns in Antiquity evolved into the idea of the arched monumental gate in Roman triumphal arches; in the Republican period, this archetype was translated into contemporary nation-state discourses through temporary taks.

In this context, TAK architecture both sustains the historical continuity of the "triumphal arch / monumental arch / ceremonial gateway" typology and, at the same time, becomes a performative stage device that makes visible the early Republic's ideals of modernization, nation-building and urban citizenship. Ceremonial TAKs erected in city squares, in front of train stations or along major boulevards can be read as temporary yet symbolically dense urban installations that stage, in public space, the fusion of state and people, the ideological framework of the new regime and a modern lifestyle through slogans, colours, symbols and lighting.

Internationally, the twentieth century produced a rich repertoire of temporary monumental gateways and festival architectures used to stage modernization narratives and mass publics. In Soviet Russia, revolutionary festivals and street decorations transformed central routes into scenographic corridors through ephemeral structures, banners, and gateways (von Geldern, 1993; Murray, 2018). The 1937 Paris International Exhibition combined permanent monuments with explicitly temporary pavilions, such as Le Corbusier's Pavillon des Temps Nouveaux, conceived for dismantling and potential reuse, demonstrating how

modernist design embraced planned ephemerality (BIE, 1937; Fondation Le Corbusier, 1937). Similarly, the 1939 New York World's Fair adopted monumental yet temporary icons—most notably the Trylon and Perisphere—built to symbolize the 'World of Tomorrow' and later dismantled (ArchDaily, 2016). Post-war Britain continued this lineage through the Festival of Britain (1951), which relied on distinctive temporary structures like the Dome of Discovery and the Skylon to project a future-oriented national image (V&A, 2024). These precedents help situate Republican taks within a broader twentieth-century culture of temporary monumental representation.

METHODOLOGY

The study is designed as a qualitative and descriptive study and adopts an interpretive approach that analyses TAK architecture through its historical, typological and spatial dimensions.

Literature review: A conceptual background was established through a review of national and international literature on temporary architecture, monuments and images, ancient Roman triumphal arches, Ottoman ceremonial architecture and early Republican celebrations. Recent scholarship published from 2020 onward reframes temporary urbanism and temporary structures as modes of producing publicness and governance through events and interim spatial practices (Bragaglia & Caruso, 2020; Krmpotić Romić & Bojanić Obad Šćitaroci, 2022; Skytt-Larsen et al., 2022; Turku et al., 2023; Behmanesh & Brown, 2025). Recent historiography on early Republican Turkey likewise emphasizes institutional and ideological production contexts beyond stylistic readings (Erol & Şenyurt, 2025).

Archival and visual data analysis: Newspaper reports from the period, municipal and provincial administration reports, official celebration programmes, photographic archives, postcards, journals (particularly visual material published in *Arkitekt*), as well as secondary sources on urban plans and square arrangements were examined. Through these materials, the historical context of taks, their ceremonial routes and their urban locations were reinterpreted.

Sample selection: The sample consists of taks used during Republic Day, Liberation Day and 23 April celebrations in cities such as İstanbul, Ankara, İzmir, Adana, Zonguldak, Diyarbakır, Samsun, Şirvan and Bolu, representing different geographical regions and political contexts. The selection criteria were defined as:

- density of documentation (photographs, written sources, plans),
- representation of different institutions and social actors (municipalities, state economic enterprises, professional associations, minority communities, etc.),
- formal diversity (number of openings, form, material).

Data reliability and limitations: Because many archival images are black-and-white and sometimes lack detailed captions, the study does not infer material, structure, or exact urban siting from a single photograph. Material/structural notes and locational information are reported only when supported by written sources (newspaper captions, official programmes, municipal reports, archival inventories). When such information is missing, the attribute is recorded as 'undocumented' in Table 1, and the example is used only for form/graphic analyses that can be robustly extracted from multiple sources. Examples that were visually accessible but lacked minimum metadata (year, location,

commissioning actor) were excluded and are noted as part of the study's limitations.

Typological and formal analysis: The selected examples were coded and analysed under the following headings:

- number of openings,
- mass and proportions,
- material and structure,
- decorative elements and graphic language,
- inscriptions and symbols carried on the structure,
- urban location and relation to the choreography of the ceremony.

On this basis, a comparative typology was constructed. This typology was then used to make visible the points of architectural and semantic continuity and rupture between the permanent triumphal arches of Antiquity and the temporary ceremonial taks of the Republican period.

Discussion and interpretation: In the final stage, the findings were analysed around the axes of modernization, nation-building, collective memory, and the performative use of public space. In this framework, the contribution of tak architecture to debates on modern architectural heritage and urban identity was critically evaluated.

DIVERSITY OF USES OF TAK ARCHITECTURE

As defined by Curl (1992), taks are arches whose designs foreground the permanence of Rome's victories; they are constructed to commemorate an event or a person—most often a military victory—and frequently carry a quadriga on top. Structurally, in their simplest sense, they may be described as arched structures supported by two four-cornered piers. Researchers, however, define them more comprehensively as arched structures that connect one or more piers, often crowned with a statue or a sculptural group, sometimes adorned with reliefs, typically built over one of the main roads of the city, allowing pedestrians and vehicles to pass underneath and bearing inscriptions that state the reason for their construction (İdil, 1989). In Roman cities, arches in Asia Minor can be examined under four types: single-bay, double-bay, triple-bay and tetrapyla.

Triumphal arches became emblematic structures during the Roman Empire. In these structures, which symbolize the ceremonial Roman procession, architectural ornament and sculpture come to the fore. The reliefs on the arches often depict events of the period, literary narratives of victories and scenes in which emperors are honored. Although triumphal arches are the first structures that come to mind when the term tak is mentioned, today the word also corresponds to temporary architectural elements built for different purposes. In this sense, it is possible to speak of three different fields of use for taks. In Turkish, all three are commonly referred to with the same term, tak. These three uses can be broadly summarized as:

- in the sense of a structural arch,
- in a broader monumental sense, and
- in the sense of a decorated façade entrance.

In this article, this broad historical lineage is not revisited in detail; instead, it is used as a conceptual scaffold to distinguish three registers of 'tak' as they appear in the literature and in practice: (1) the arch as a structural element, (2) the arch as a symbolic gateway with monument-like meaning, and (3) the arch as a decorated portal or façade entrance that functions as a scenographic interface in public ceremonies. This distinction allows early Republican taks to be analysed not as replicas of ancient monuments, but as temporary urban devices that mediate passage, representation, and spectacle in modern city space.

The use of tak architecture and its deployment in celebratory contexts continued frequently in the Republican period as a cultural practice inherited from the Ottoman era.

TAK ARCHITECTURE IN THE REPUBLICAN PERIOD (1923-...)

Within Turkish architectural and urban vocabulary, the term tak refers to an arched ceremonial gateway—often designed as a temporary, decorated portal erected for public rituals such as national days, liberation celebrations, inaugurations, and institutional displays. Unlike permanent monuments, taks operate through planned assembly and dismantling; they stage a short-lived but highly visible form of monumentalisation in public space. Recent scholarship since 2020 has expanded debates on temporariness toward governance, event-based public space production, and the politics of interim uses, showing how time-bounded spatial interventions can function as strategic urban devices (Bragaglia & Caruso, 2020; Skytt-Larsen et al., 2022; Turku et al., 2023; Behmanesh & Brown, 2025). Building on this perspective and on earlier work on portable architecture and the temporary city (Kronenburg, 2008; Bishop & Williams, 2012), this section frames early Republican taks as temporary monumental devices that mediate passage, spectacle, and ideological communication in the newly reconfigured squares and boulevards of early Republican Turkey (1923-1938).

In the cities built after the proclamation of the Republic, monuments became the most widespread architectural medium through which Turkey's transforming structure could be expressed. In this process, both permanent monuments erected in squares and temporary structures designed for holiday and celebration ceremonies emerged as spatial tools for nation-state construction. Foremost among these structures are the 'arches', which trace their origins to ancient triumphal arches but were reproduced with a modern narrative during the Republican era. The architecture of the 'arch,' often defined in the literature by its transience and symbolic intensity, served not only as decoration in the early Republican period but also as a 'spatial interface' that facilitated contact between the state and the people in the public sphere and conveyed ideological messages (through slogans, colours, and portraits) to the masses. Not only in Turkey but also in many other countries undergoing processes of change, transformation or distinct sociological developments, monuments have long been among the most preferred elements for representing and symbolising an idea. In general, these are permanent monuments. In this respect, elements that can be classified as taks differ from the first images that come to mind when one thinks of monuments today, as they possess a temporary monumental character.

The most striking components of Republican celebrations are the monumental-scale taks. These taks are modern instruments of representation that continue the functions of their archetypes, the ancient triumphal arches. Situated in locations such as main streets and squares—crowded urban spaces where

public events take place—these temporary structures communicate with their audiences through multiple channels (Tozoğlu, Kaymaz & Sezen, 2022). The slogans and national or political symbols displayed on them convey the official narrative. Especially in the Republican period, taks became one of the leading representational devices in ceremonies and celebrations for visualising the new system of government, the reforms and Kemalist ideas.

The literature indicates that taks were indispensable elements of celebrations held across the country on Republic Day and on local liberation days marking the recapture of cities. In particular, the taks designed for the Tenth Anniversary of the Republic rose in the cities as powerful symbolic markers. These taks were generally designed by architects. While the People's Party Column (Halk Fırkası Sütunu) designed by architect Seyfettin Nasih was erected in Sultanahmet Square in Istanbul, the State Railways Monument (Devlet Demir Yolları Anıtı) by architect Bedrettin Hamdi was built in Ankara for the Tenth Anniversary celebrations (Okumuş, 2021) (Figure 1a). Another emblematic Republican tak, commissioned by İş Bank, was designed by architect Nizamettin. One of the most important Republican-period taks—the project for the Karaköy Cumhuriyet Takı in Istanbul—was entrusted to foreign architects Margarete Schütte and Wilhelm Schütte (Karain, 1996) (Figure 1c).

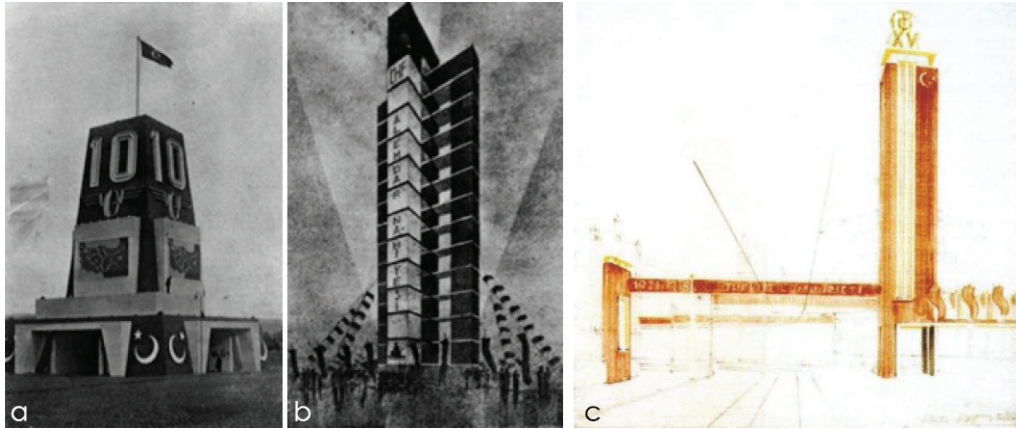


Figure 1. a) State Railways Monument designed by architect Bedrettin Hamdi for the Tenth Anniversary of the Republic (Okumuş, 2021). b) Ceremonial arch and light tower built for the Republican People's Party, designed by Seyfi Arkan in 1933 (Okumuş, 2021; Bozdoğan, 2002). c) Karaköy Republic Arch designed by Margarete Schütte and Wilhelm Schütte (Okumuş, 2021; Karain, 1996).

Designed in 1938 for the Republic Day celebrations and constructed as a temporary structure, this tak predominantly employed red and white colours. At the very top of the Karaköy Republic Arch, a section enlivened by illumination bears the Roman numeral XV (fifteen) together with the letters "T.C.". On the sides, the portrait of Atatürk and Turkish flags are placed, catching and reflecting daylight (Karain, 1996).

Preparations for the first liberation celebrations held in İzmir on 9 September 1923 began about a week in advance, and all shops, stores and houses in the bazaars and neighbourhoods were decorated with flags (Temizgüney, 2021). In addition to large numbers of people arriving from the surrounding districts, commanders who had played a significant role in the liberation were also invited to the festivities. Triumphal taks were erected along all the streets stretching from the Government House to Basmane and along the Kordon; depictions of Mustafa Kemal Pasha and other commanders were placed on the arches. In subsequent years, İzmir's liberation day continued to be celebrated with great splendour (Figure 2).



Figure 2. Republic Day celebrations in Tire, İzmir, 1933 (URL 2).

During the 1942 liberation celebrations in İzmir, the city was once again adorned with flags from end to end and triumphal arches were erected. After the Democrat Party came to power, in addition to Victory Day, signs referring to the Democrats' "Victory of 14 May" were incorporated into the visual language of the celebrations (Temizgüney, 2021). In the following years, the city was decorated with taks, flags and flowers for the festivities. The well-known İzmir institution Tariş, together with the Basmane and Alsancak railway directorates, commissioned triumphal arches and placed them at certain points in the city (Şavkılı & Kösele, 2023). Triumphal arches were also erected in front of the buildings of the Democrat Party and the Republican People's Party and decorated with flags.

6 October, the date marking Istanbul's liberation from enemy occupation, came to be referred to as "Liberation Day" (Kurtuluş Bayramı). In the press of the period, reports on the events related to this date likewise used the term "Liberation Day". The activities organised for the first anniversary of Istanbul's liberation (6 October 1924) continued in subsequent years (Kalemlı, 2018). Thus, the 1924 Liberation Day celebrations constitute the event in which the first triumphal tak of the Republican period was erected.

In preparation for 5 October, all of Kadıköy and Üsküdar were extensively decorated, and large triumphal arches were constructed along the routes where the army would pass through these districts. In Kadıköy, at Altıyol, Feneryolu, Göztepe Avenue and many other locations, triumphal arches carefully built for the occasion were adorned with red-and-white ribbons, laurel branches and flowers (Kalemlı, 2018). At the entrance of Göztepe Square, a triumphal arch was erected and decorated with a photograph of Gazi President Mustafa Kemal Pasha in his Commander-in-Chief uniform, taken shortly after the recapture of İzmir. On 6 October, for the ceremonies in Taksim, a large triumphal arch was built, and boards bearing the inscriptions "Long live the great army, long live the Republic of Turkey!" were hung beneath large portraits of the President. Next to the triumphal arch, a rest area was arranged. During the ceremonies, cinema and photographic cameras continuously recorded the procession (Kalemlı, 2018).

During the celebrations of the 12th anniversary of Republic Day in Bolu, it is reported that, in addition to various decorations, triumphal arches were erected in front of the 135th regiment (Altan, 2021). Altan (2021), also notes that during the 13th, 20th and 24th anniversary celebrations, triumphal arches were again set up in various parts of the city. Although he does not explicitly state that triumphal



Figure 3. Taks prepared for various celebrations in İstanbul (from left to right) Tenth Anniversary of the Republic celebrations (URL 3) Tenth Anniversary celebrations in Şehzadebaşı (URL 4) Tenth Anniversary celebrations in Beyoğlu (URL 5).

arches were erected in the intervening years, his emphasis on the organisation of celebrations similar to those of previous years suggests that such arches were likely constructed in those years as well (Figure 3).

In Şirvan, ceremonies were organised for Republic Day in 1941, 1942, 1944, 1946, 1948 and 1949, during which the municipality erected taks along the streets where the celebrations were most intensely held and commissioned decorations with flags, flowers and panels (Demir, 2015).

The use of triumphal arches in various events organised for Republic Day celebrations is also observed in Diyarbakır. In the 1940 celebrations, two triumphal arches were erected at two important points along the main street; these taks were decorated with flags, lanterns and branches, and additionally adorned with portraits of the "Eternal Chief" and the "National Chief" (Çoban, 2019). In the 1942 celebrations, the city was entirely adorned with national colours, arches and tree branches. In 1943, the celebration committee placed eight triumphal arches at different locations, and the number "20", marking the twentieth anniversary of the Republic, was written in large characters and hung at the top of these arches. In 1945, three selected locations in the city were equipped with triumphal arches, and in 1948, a triumphal arch was erected in front of the People's House (Halkevi). For the 1947 and 1949 celebrations, the researcher Çoban (2019) notes, without specifying an exact number, that triumphal arches were placed in various parts of the city (Figure 4).

During the Republic Day celebrations held in Zonguldak in 1928, 1929 and 1932, triumphal arches were erected in front of major buildings such as the Government House, the municipality building, the Turkish Aeronautical Association (Tayyare Cemiyeti), the fire brigade garage, as well as along the city's main streets; the city was adorned with laurel leaves.

In the Tenth Anniversary celebrations of the Republic in 1933, the festivities, initially planned to last three days, were carried out with great enthusiasm. While it was first envisaged that twelve or thirteen taks would be erected for the holiday, the actual number exceeded one hundred and fifty; houses were decorated with flags and laurel branches, and the streets were embellished with red-and-white colours and greenery (Namal & Toparlak, 2022).



Figure 4. A Tak decorated with tree branches, prepared for Republic Day celebrations in Diyarbakır (Çoban, 2019).



Figure 5. a) Tak of the Chamber of Physicians, b) Tak of Ziraat Bank, c) Tak of Salonika Bank, d) Tak of Ottoman Bank, e) Tak of Is Bank, f) Tak of S.R. Giledo Factory (Kalafat & Kalafat, 2022)- Adana, 1933.

In 1936, triumphal arches were erected by the municipality, the Ereğli Company, Türk-İş, Kömür-İş, İş Bank and the State Railways. On these arches, the number thirteen—marking the thirteenth anniversary of the Republic—was written in large illuminated numerals, particularly on the taks placed in front of the party headquarters. In 1937 and 1938, as in previous years, all public offices, taks, the municipality building, the CHP building, the People's House, mining pits, stations, streets and squares, as well as land and sea vehicles, were decorated with flags. In Samsun, too, triumphal arches were erected along the streets for Republic Day celebrations. In his study, Haykır (2021), presents the celebration programmes between 1934 and 1950 and shares details of the planned festivities. These programmes state that the streets would be decorated with flags, pictures, panels, inscriptions and taks (Haykır, 2021).

As a region that experienced the National Struggle very directly, the city of Adana was among the places that prepared most intensively for these celebrations. The taks erected in the middle of the streets, in forms allowing both pedestrians and vehicles to pass underneath, became prominent symbols of the grand ceremony in Adana, which drew nearly 50,000 participants (Figure 5). In their article examining in detail the Tenth Anniversary celebrations of the Republic held in Adana, Oğuz Kalafat and Emine Kalafat (2022) place particular emphasis on tak architecture. The authors note that around forty taks were built and that their forms varied, including oval, square, rectangular and triangular shapes (Kalafat & Kalafat, 2022) (Figure 6).

As can be seen in Figure 7, the use of taks in the celebrations showcased the unity of the people of Adana, who belonged to different professions and faiths.

For the ceremonies held in Ankara, official documents of the period, together with newspaper articles, photographs and other visual depictions, provide a continuous narrative. Wooden tribunes were constructed and placed side by side in front of the Parliament building for the Republic Day celebrations. According to Tozoğlu and his colleagues (2022), in a city like Ankara, which at that time did not yet possess urban facilities such as a stadium or a hippodrome, such arrangements were undoubtedly both economical and highly practical. In addition to the official ceremonies defined by the Square and Station Street, daytime parades of students, scouts and soldiers, as well as torchlight processions



Figure 6. a) Tak of Millî Mensucat Factory, b) Tak of Şalih Factory, c) Tak of Çırçır Factory, d) Tak of the Chamber of Commerce and Grain Exchange, e) Tak of the Haberdashers' and Drapers' Association (Kalafat & Kalafat, 2022), Adana 1933.

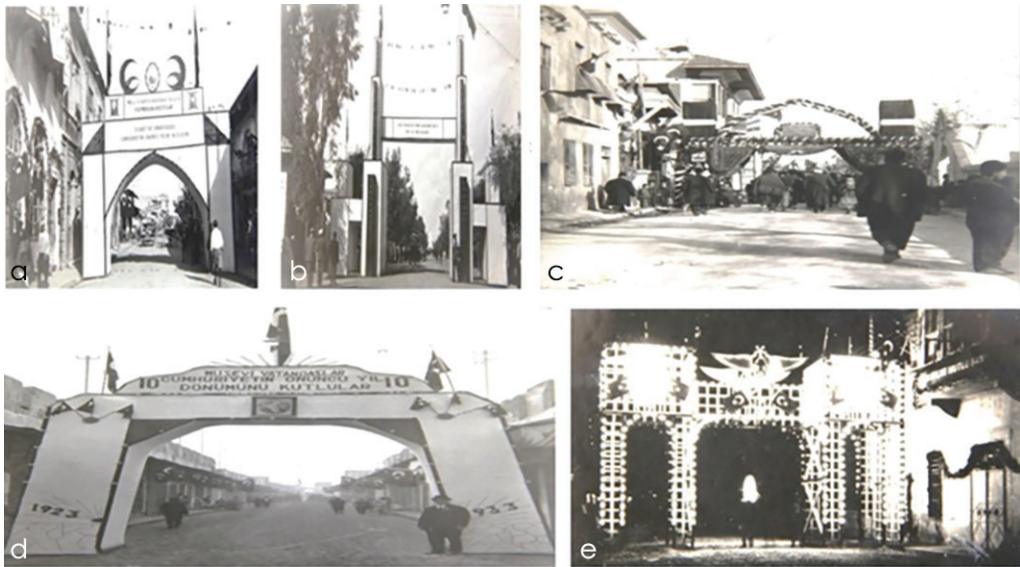


Figure 7. a) Tak of the Chamber of Commerce and Industry, b) Tak of the Turkish Merchants' Group, c) Tak with Arabic script, 15d. Tak of Jewish Citizens, e) Tak of the athletes (Kalafat & Kalafat, 2022).



Figure 8. The crowd watching the passage of cyclists during the ceremony on İstasyon Street in Ankara and the arch erected in front of the first parliament building, 1928 (Tozoğlu, Kaymaz & Sezen, 2022, Koç University VEKAM Library and Archive, Inventory no. 2709).

in the evening, were organised along a route extending from Karaoğlan (Anafartalar) and Çocuk Sarayı streets through Samanpazarı and Fire Brigade Square to Bankalar Street, and ending at Hakimiyet-i Milliye Square (Tozoğlu, Kaymaz & Sezen, 2022). Taks are particularly striking in these ceremonies. In Ankara, uses that go far beyond traditional urban illumination practices can also be observed in the context of holiday celebrations. Illuminated panels in the squares and lighted taks along the streets serve as media through which slogans and messages are conveyed to the masses (Figure 8).

In the literature, information on tak architecture generally focuses on city liberation days and 29 October Republic Day celebrations; however, it is also noted that during the early Republican (1923-1938) period, taks were erected as part of the decorations in front of important streets and buildings for the 23 April Children's Day celebrations as well (Temizgüney, 2019). In a broader sense, celebrations held on national holidays also functioned as events in which exhibitions were organised to present to the public the material achievements of the Republic and the lifestyle transformations brought about by the reforms. In this respect, taks can be understood as a kind of urban installation (Figure 9). The architectural journal *Arkitekt* published photographs and short descriptions of the taks to be displayed in İstanbul and Ankara for the 10th and 11th anniversaries of the Republic (Tozoğlu, Kaymaz & Sezen, 2022). Some of these taks—used as small exhibition pavilions in which state economic enterprises such as the State Railways, İş Bank, Sümerbank and the Ministry of Water displayed their investments—were designed by prominent architects of the period. For instance, the Temporary Monument (Muvakkat Abide) of the State Railways in Ankara was designed by architect Bedrettin Hamdi; the Iron Column (Demir Sütun), exhibited on the Galata Bridge, was designed by architect Abidin; and the People's Party Column (Halk Fırkası Sütunu), displayed in Sultanahmet Square, was designed by architect Seyfettin Nashi.

FINDINGS: CLASSIFICATION OF COMMON FORMAL FEATURES

Tak architecture can be categorised under several headings based on the examples examined. The sample set and its documentation status are summarized in Table 1; the analytical typology of common formal features is synthesized in Table 2.

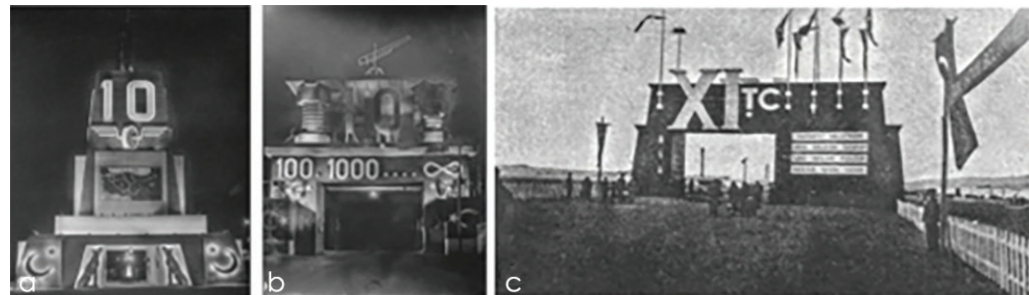
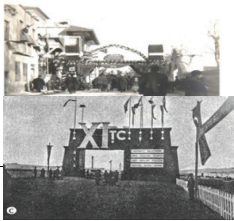
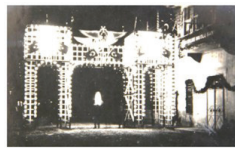
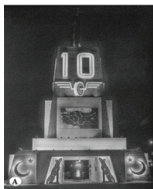


Figure 9. Some arches prepared for Republic Day celebrations (Tozoğlu, Kaymaz & Sezen, 2022).

Example/ Figure(s)	City	Year / Event	Urban location (as reported)	Commissioning actor	Main source(s)	Material/ structure data (source-based)
Fig. 1a	Ankara	1933 / 2nd Anniversary	Station axis / ceremonial route (literature- based)	State Railways	Okumuş, 2021	Undocumented in sources cited here
Fig. 1b	Ankara	1933 / 2nd Anniversary	Ceremonial route (literature- based)	Republican People's Party (CHP)	Okumuş, 2021; Bozdoğan, 2002	Undocumented in sources cited here
Fig. 1c	İstanbul (Karaköy)	1933 / 2nd Anniversary	Karaköy (district-scale urban node)	Municipal/ ceremonial organization (literature-based)	Okumuş, 2021; Karain, 1996	Undocumented in sources cited here
Fig. 2	Tire (İzmir)	1933 / Republic Day	Not specified in image caption; city- centre route	Local authorities / community (implied)	URL 2	Undocumented; image-based only
Fig. 3a-c	İstanbul (multiple districts)	1933 / 2nd Anniversary	Şehzadebaşı; Beyoğlu; other districts (as per image sources)	Municipal/ ceremonial organization (implied)	URL 3-5	Undocumented; image-based only
Fig. 4	Diyarbakır	1934-1949 / Republic Day (period)	Main celebration streets (Çoban, 2019)	Municipality / local administration	Çoban, 2019	Vegetation/ branches visible; structure undocumented
Fig. 5a-f	Adana	1933 / 2nd Anniversary	Main streets / public route (Kalafat & Kalafat, 2022)	Banks, professional chambers, factory	Kalafat & Kalafat, 2022	Form documented; structure/ material largely undocumented
Fig. 6a-e	Adana	1933 / 2nd Anniversary	Main streets / public route (Kalafat & Kalafat, 2022)	Factories, associations	Kalafat & Kalafat, 2022	Form documented; structure/ material largely undocumented
Fig. 7a-e	Adana	1933 / 2nd Anniversary	Main streets / public route (Kalafat & Kalafat, 2022)	Chambers; merchants; citizens groups	Kalafat & Kalafat, 2022	Form documented; structure/ material largely undocumented
Textual case	Zonguldak	1925-1938 / Republic Day	Government House, municipality, CHP/People's House, station, main streets	Municipality; public institutions; enterprises	Namal & Toparlak Şahin, 2022	Material/structure undocumented in reviewed sources
Textual case	Samsun	1934-1950 / Republic Day	Streets along the ceremonial route (program- based)	Municipality / local administration	Haykır, 2021	Material/structure not specified in programmes
Textual case	Bolu	1933-1948 / Republic Day	In front of the 135th regiment; various urban points	Local administration / military context	Altan, 2021	Material/structure undocumented
Textual case	Şirvan (Siirt)	1941-1949 / Republic Day	Streets where ceremonies were most intense	Municipality	Demir, 2015	Material/structure undocumented

Table 1. Dataset and
documentation matrix.

Table 2. Common Formal Features.

NUMBER OF OPENINGS AND PASSAGE TYPE	Single-bay arches Taks (figure: Side, Turkey, Mansel, 1958).		MATERIAL AND STRUCTURE	Timber frame and skeletal Taks (figure:Tak of the Chamber of Commerce and Grain Exchange, Kalafat & Kalafat, 2022)	
	Multi-bay arches (two- or three-bay) Taks (figure: Side, Turkey, Mansel, 1958).			Taks defined by greenery and vegetation (figure: Republic Day cel.,Diyarbakır Çoban, 2019)	
	Corridor-effect and serial Taks (figure: Bâb-ı Hümayun- URL1)			Hybrid systems (figure: Tak with Arabic script, Kalafat & Kalafat, 2022)	
VERTICAL MASSING AND SILHOUETTE COMPOSITION	Gate-type portal Taks (figure: Tak of İsbank, Kalafat & Kalafat, 2022)		COLOUR, GRAPHIC LANGUAGE AND SYMBOLIC MEANING	Taks dominated by national colours and symbols (figure: Republic Day cel. Tozoğlu, Kaymaz & Sezen, 2022)	
	Tower-integrated a Taks (with columns/light towers) (figure: Tak of the athletes Kalafat & Kalafat, 2022)			Portrait- and figure-focused Taks (figure : Republic Day cel., Beyoğlu, URL-5)	
	Pavilion-like Taks (figure: republic day cel., Tozoğlu, Kaymaz & Sezen, 2022)			Taks with a strong emphasis on corporate logos and text (figure: Tak of S.R. Giledo Fac., Kalafat & Kalafat, 2022)	
URBAN POSITIONING AND CEREMONIAL CHOREOGRAPHY					
Square–boulevard junction Taks (figure: Tak of Salonika Bank, Kalafat & Kalafat, 2022)	Taks in front of station public buildings (figure: republic day cel., Tozoğlu, Kaymaz & Sezen, 2022)	Neighbourhood-scale Taks (Figure: İstanbul, URL-5)			
					

a. According to Number of Openings and Passage Type:

Single-bay arches Taks: Examples with a strong axial emphasis and a single passage opening that follow the classical triumphal arch typology. Some of the taks erected for the Tenth Anniversary celebrations in İstanbul and Ankara, as well as those built in front of railway stations, fall into this category.

Multi-bay arches Taks (two- or three-bay): Republican-period taks placed on main boulevards, whose side openings provide dynamism and allow large ceremonial processions to pass through, parallel to the ancient examples of Patara, Hadrian's Arch and Orange.

Corridor-effect and serial arches Taks: In Adana, certain taks, the Bâb-ı Hümâyün Gate, and numerous smaller-scale arches aligned in sequence along a main urban axis create a "continuous passage" effect, turning the ceremonial route into a kind of stage tunnel.

b. According to Vertical Massing and Silhouette Composition:

Gate-type portal Taks: A type defined by two supports and an upper beam/arch that connects them, producing a clear and legible entrance image.

Tower-integrated Taks (with columns/light towers): As seen in examples such as the CHP light tower or the State Railways Temporary Monument, tall tower or column elements integrated into the arch composition reinforce both nighttime illumination and monumental emphasis.

Pavilion-like Taks: In the taks commissioned by institutions such as İş Bank, Sümerbank or Tarih, exhibition panels, niches, display surfaces and, at times, the formation of a small interior volume transform the tak into a kind of micro exhibition pavilion / corporate showcase.

c. According to Material and Structure:

Timber frame and skeletal Taks: Frequently observed in Ankara and provincial towns, these are taks that can be rapidly assembled and dismantled, consisting of a timber skeleton completed with fabric, stucco (or cardboard), boards and lighting.

Taks defined by greenery and vegetation: As in the examples from Zonguldak, Diyarbakır and Kadıköy–Göztepe, these types are adorned with laurel branches, flowers and tree branches, turning landscape elements directly into structural and decorative components.

Hybrid systems: Compositions in which temporary tak components are added onto a pre-existing street or square structure, thereby transforming the urban infrastructure into an instrument of staging (for instance, the Iron Column placed on the Galata Bridge and similar examples).

d. Colour, Graphic Language and Symbolic Meaning:

Taks dominated by national colours and symbols: Examples that directly visualise the Republican narrative through the use of a red-white colour palette, Turkish flags, crescent-and-star motifs, and numerical compositions highlighting years such as "10", "13" or "20". The inscription "XV" and the letters "T.C." on the Karaköy Republic Arch are early and striking instances of this visual language.

Portrait- and figure-focused Taks: Taks that become stages making social plurality visible through Atatürk portraits, military figures, depictions of commanders, and, in some cities, figurative panels representing Jewish citizens, athletes or various professional groups.

Taks with a strong emphasis on corporate logos and text: Taks commissioned by actors such as banks, factories, chambers of commerce and industry display their logos, production themes and slogans, forming a “corporate monument” type that incorporates economic development and modern production relations into the broader narrative of the Republic.

e. Urban Positioning and Ceremonial Choreography:

Square–boulevard junction Taks: Taks positioned at nodal points where squares connect to main axes, designed as thresholds marking the entry and exit points of ceremonial processions (e.g., İstanbul Taksim, Ankara Station Street).

Taks in front of stations and public buildings: Taks erected in front of railway stations, government houses, municipal buildings, People's Houses and party headquarters, placing centres of transport and administration at the heart of the festive choreography.

Neighbourhood-scale Taks: In smaller settlements such as Tire, Şirvan or Bolu, taks erected at the scale of the bazaar or neighbourhood reveal the ways in which Republican ideology permeated local and everyday urban life.

CONCLUSION

This article set out to examine triumphal arches (taks) built in city squares and along main ceremonial axes during the early Republican period in Turkey as temporary architectural elements positioned between the typologies of monuments, gateways, and decorative portals.

Tak architecture has served as a significant architectural image since antiquity. To the codes it has historically carried—such as propaganda, communication of information, commemoration, honouring, ownership and belonging—the Republican period added new layers associated with modernization, particularly the emphasis on contemporaneity and the aspiration to create a modern city. This process also fostered collaboration between disciplines such as architecture, urban planning and sculpture in the production of urban spaces.

Considering this spatial practice within the scope of modern architectural heritage and ensuring its preservation and transmission to future generations in Turkey's urban centres and squares plays a crucial role in sustaining social memory. These structures, which employ the innovative design approaches and construction technologies of their time, stand as representatives of the design ethos of their period. Although most of them were temporary, their conservation value, historical significance, aesthetic and artistic qualities, as well as their functional and symbolic meanings, should continue to be highlighted through exhibitions and commemorative events so that they may retain a place in collective memory. The role of tak architecture in shaping urban identity makes it essential to safeguard its position within urban memory.

Despite not being permanent buildings, Republican-period taks emerge as highly charged nodal points in the modernisation narratives of cities. These temporary structures, which inherit the spatial logic of ancient triumphal arches, generate temporary axes, stages and frames that effectively “rewrite” the city on ceremonial days. For this reason, tak architecture should be approached not only as a medium of political and ideological representation but also as an interdisciplinary design laboratory at the intersection of urban design, lighting, graphic design and exhibition practices. Taking early Republican taks as a reference for contemporary temporary installations, festival structures and

thematic gateways in public spaces today would both render this heritage more visible and help establish a line of local continuity within contemporary design culture.

A key limitation is the unevenness of archival metadata: many images are monochrome and lack explicit information on material, structural system, or exact urban coordinates. For this reason, attributes are recorded as 'undocumented' where written evidence is unavailable (Table 1), and the analysis privileges elements that can be supported by multi-source triangulation. Developing the corpus through additional primary archival records (municipal archives, project drawings, and construction records) would enable future research to deepen the material and structural reading of these temporary devices.

Based on the comparative reading of the documented sample (Table 1) and the typological synthesis (Table 2), the study indicates that Republican taks repeatedly mobilize a limited set of formal and graphic devices: single- or multi-bay passage frames, gate-like silhouettes, and strong red-white chromatic and emblematic codes (Atatürk portraits, institutional emblems, numerical slogans). Rather than claiming technical details from photographs alone, the paper treats these devices as a temporary but legible communication infrastructure that rewrites urban space during national ceremonies.

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Legal Public/Private Permissions:

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Hospital Garden Design for Cancer Patients: A Case of Malatya Oncology Hospital

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Abstract

Clinical findings have shown that gardens have a positive effect on the mental well-being of patients and also contribute to an improvement in the physical condition. However, cancer patients who have to stay in hospital for a period of time to complete their treatment usually do not have access to open areas with natural elements. Gardens with fresh air and a calm environment help cancer patients control their feelings of hopelessness and anxiety and improve their mental ability to cope with a difficult situation. This study aims to design a hospital garden with therapeutic value and to provide specific design strategies for the healing gardens of cancer patients. To achieve this goal, two balconies of İnönü University Oncology Hospital in Malatya, Turkey, were selected as design examples. The method consists of four consecutive steps: (1) a literature review to determine the design criteria of healing gardens, (2) analysing the case study, (3) identifying the needs and evaluations of cancer patients and experts, and finally (4) developing a list of design strategies based on the data obtained in the previous steps. As a result, specific design principles for the creation of an internal hospital garden were proposed, which can serve as a model for future hospital gardens and also provide practical guidance for architects and landscape architects.

Keywords: Cancer Patients, Environmental Design, Healing Landscape, Hospital Indoor Gardens.

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INTRODUCTION

Health centers and medical clinics can be associated with extreme anxiety and tension for patients and their caregivers. One of the growing groups of hospital users is cancer patients who have to stay in hospital for a long treatment period. (Partanen et al., 2018). Cancer is a dreaded diagnosis and cancer patients need to keep their spirits high and not lose their motivation to fight the disease. Cancer patients are more likely to experience negative feelings such as depression and anxiety. These are both psychological and physiological disorders characterized by a number of physical, emotional and behavioral elements (Kaphle, et al., 2024). In most cases, it is difficult to control the stress and anxiety of cancer patients. Researchers have suggested that being in a more natural environment is relaxing and less stressful and therefore has a positive effect on hospitalization outcomes (Niebler-Walker et al., 2023). Natural environments have a positive effect on stress reduction (Andrade et al., 2012) and with deliberate design, these environments can increase their therapeutic effect on users (Cervinka et al., 2014). Nature can have several positive effects on human health: (1) reducing stress by lowering blood pressure and cortisol levels (Ward Thompson et al., 2016), (2) improving mental health by reducing depression and boosting mood and self-esteem (Gascon et al., 2015), (3) providing better cognitive and creative function by restoring the ability to think deeply and be creative, and (4) improving physical health by reducing obesity and diabetes and increasing cardiovascular health (Sanders et al., 2015; Niebler-Walker et al., 2023). Therefore, the creation of a dedicated healing garden in hospitals and healthcare settings seems to be a logical solution to this problem.

The term healing garden is often used to describe green open spaces that aim to improve health outcomes by reducing stress, providing positive distraction, and promoting overall well-being (Cooper Marcus & Barnes, 1999). Healing gardens in healthcare settings can provide users with access to nature while also providing opportunities for other activities such as play, rest, and socialization. Kaplan and Kaplan (1989) stated that access to a simply designed natural environment helps to reduce stress by neutralizing mental fatigue and cognitive chaos caused by the complexity and unfamiliarity of the hospital environment (Pasha, 2013). It can provide therapeutic and medical services such as horticultural therapy, creative arts therapy, acupuncture and infusion treatments for cancer patients in its private gardens. Therapeutic gardening and health goals can be linked. Therapeutic goals for people suffering from cancer often aim to give them a sense of hope, renewal and healing. Reflecting the diversity of cancer types and stages, each healing garden can feature a mix of natural and medical features, including hard and soft landscaping and aesthetic ambiance (Ulrich, 1992). Thus, healing gardens can serve a dual function — a platform for the provision of therapies and services as well as a place of physical sanctuary. In addition, research shows that healing gardens can directly or indirectly reduce healthcare costs by shortening the length of stay for patients. The need for an interdisciplinary approach in nature and health-related research has become clear in theory (Frumkin et al., 2017). But in practice, the related researches about the planning and designing of the healing garden in hospitals, seems insufficient and rudimentary.

In order to better understand how healing gardens are implemented in practice, several international case studies can be examined. These examples demonstrate the integration of healing gardens into hospital design. Marin General Hospital incorporates rooftop gardens and green terraces to enhance patient interaction with nature, while Kaiser Permanente Hospital integrates outdoor activity areas and sustainable landscape strategies to support physical

and psychological well-being (URL1; URL2). Similarly, projects such as Shenzhen Children's Hospital and Alder Hey Children's Hospital apply biophilic design principles through accessible green spaces, sensory landscapes, and strong visual connections to nature (URL3; URL4). These examples highlight the growing importance of nature-based design in healthcare environments. However, such comprehensive applications remain limited in Turkey, particularly in the context of indoor healing gardens for cancer patients. Therefore, this study aims to address this gap by proposing a context-specific design approach based on user needs and environmental analysis.

Healing Garden Design

Extensive research associated with the history of healing gardens has encouraged modern hospitals to use some of their space for healing gardens, courtyards, and playgrounds (Pasha, 2013). For a garden to have a healing effect, it should have certain characteristics of the natural environment so that patients can achieve a sense of relaxation, tranquility, and mental recovery. These areas should be rich in plant species, accessible to all users, and consistent and safe (Cervinka et al., 2014). It is important to create opportunities for people to spend time, socialize, walk, and exercise in the environment, and to provide an attractive space for patients and staff (Van den Berg & Custers, 2011). Therefore, to create a specifically beneficial environment for patients staying or using the hospitals, designers need to consider diverse issues (Cooper Marcus & Barnes, 1999). Well-designed medicinal hospital gardens create a social atmosphere by saving patients from the monotony of the clinical environment and positively affect patients' clinical outcomes by reducing stress, thus making patients feel good psychologically and physiologically (Ulrich, 2020). Diverse criteria and issues for designing hospital gardens have been determined in different research. Table 1 provides a list of the important items and points that should be addressed in designing a hospital garden.

When designing a healing garden, it is important to understand the physical and psychological effects of cancer. Cancer treatment (chemotherapy, radiation, surgery) can lead to fatigue, dizziness, loss of strength and stamina, reduced mobility and a feeling of loss of control (Eckerling et al., 2020). These changes may be temporary or permanent during treatment. Equally important, the psychosocial impact of cancer can include a sense of loss, anxiety, limited independence, social stigma and being labeled as a person with cancer. The challenge in designing healing gardens for cancer patients is to take into account the needs of patients, especially those related to their physical illnesses (Fleming & Figueiredo, 2013).

Table 1. Important criteria in designing the hospital gardens mentioned by different resources. (Authors).

Researcher	Healing Garden Design Criteria	Researcher	Healing Garden Design Criteria
Robert Paine (1990)	• Space planning and location • Physical access • Outdoor view • Awareness of outdoors • Plant diversity • Area furniture • Storage and equipped areas • Control of area	Scott Scarfone (1996)	Visual and physical access Attractive feature of nature Interdependency of people Provision of public, private, and semi-private spaces Increased emotional awareness Personalized space
James Burnett (1997)	• Spirit of the area • Maximum exposure to the external environment • Sensory stimulation • Horticultural therapy	David Kamp (1996)	Field analysis Diversity in space design Ease of use and accessibility Diversity of plant material Increase healthcare quality
Clare Cooper Marcus and Marni Barnes (1995)	• Location, space planning, and wayfinding • Planting, seating, and aesthetic details • Policy on the provision and maintenance of gardens	Christopher Delaney and Burnett, (1990)	• A safe haven • Closed connecting rooms • Order in the area • Water use • Interaction of nature and biodiversity
Susan Ghose (1996)	• Accessibility and visibility diversity of emotional input • Design diversity • Difference from interior design	Cheryl Ware (1994)	• Physical and emotional safety • Attractive entrance • Seasonality • Beauty • Places of interest
Mara Eckerling (1996)	• Sense of place • Garden location as to interior spaces • Garden arrangement • Involvement of the senses	Renata Valente, & Clare Cooper Marcus (2015).	• Plenty of shade and the lack of glare • Private and semi-private spaces • Soothing sounds and avoiding noise • Paths with a smooth surface • Rooms with views to the garden for patients with weak immune system

In Turkey, there are only a limited number of healthcare facilities and centers with dedicated open spaces or gardens for patients and other users. They usually have an open entrance area that is often busy with people, cars, cafés and parking lots. The entrance areas of the health centers cannot meet patients' needs for a green and quiet garden with a therapeutic effect. Therefore, patients, especially those suffering from cancer, have no place where they can escape the frustrating feelings of helplessness and hopelessness during their difficult illness experience. The present work aims to create a model of garden design for İnönü University Oncology Hospital, In Turkey, the process and approach to the design of hospitals, including their indoor and outdoor spaces, follow the guidelines used in many other countries. The current standards for the open spaces of the hospitals are limited to the "Turkish Health Buildings Minimum Design Standards 2010 Guide" published by the "Ministry of Health Construction and Repair Department" (Özgen & Onaran, 2023). The design criteria of indoor balconies, terraces and outdoor areas of the health centers are not yet included in detail in this guide. This research provides specifically designed guidelines for the healing garden aimed at cancer patients and their caregivers who are coping with cancer. Several aspects were considered in the design of the garden to reduce user stress, create a balanced sensory environment, increase

motivation and ensure a higher level of comfort for patients, medical staff and other users.

Although previous studies have highlighted the benefits of healing gardens in healthcare environments, there is a lack of comprehensive research focusing specifically on indoor healing garden design for cancer patients, particularly within the context of Turkish healthcare facilities. This study aims to address this gap by proposing a design model based on both user needs and environmental analysis. In addition, this study aims to raise awareness of the need to consider indoor gardens (or healing gardens) and to contribute to the theoretical and practical aspects of the subject.

STUDY AREA

The present work aims to design an indoor hospital garden where patients can receive psychological and physical therapies. It also introduces a garden design approach to promote patients' medical recovery and improve the quality of the hospital environment by ensuring an optimal level of comfort for patients and medical staff. The İnönü University Oncology Hospital (IUOH) on the university campus in the Battalgazi district of Malatya/Turkey was selected as the study site (Figure 1).

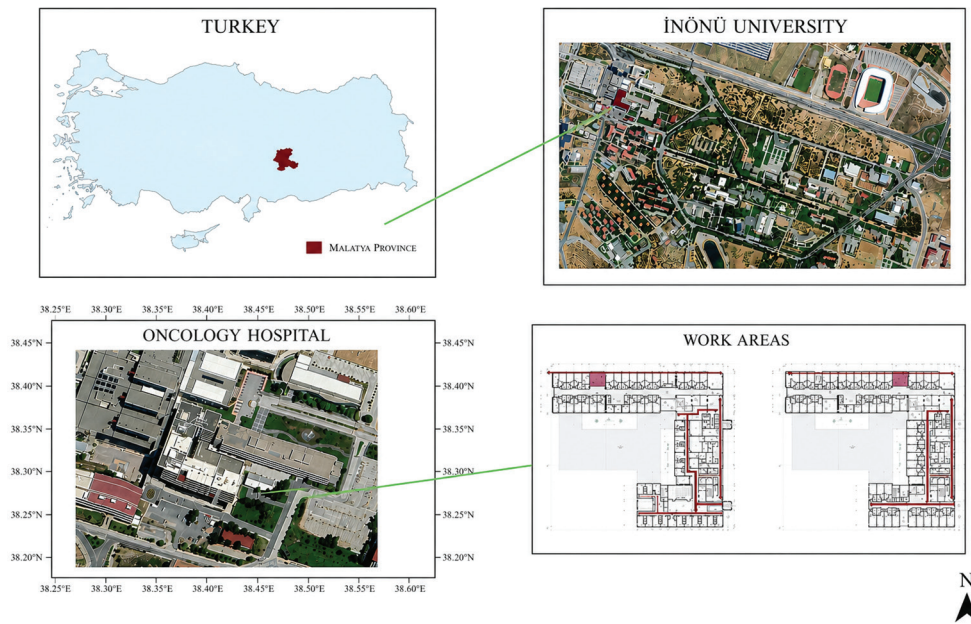


Figure 1. Location of Malatya İnönü University Oncology Hospital (IUOH) (Arkiv, 2023).

IUOH has an enclosed area of 31,590 m² and is the largest oncology hospital in Turkey. It has been providing services to Turgut Özal Medical Center since 2020. The building has 176 oncology-hematology patient rooms, 20 treatment rooms for bone marrow patients, 16 intensive care rooms and 5 iodine treatment rooms. It also includes a chemotherapy room for 84 people and 16 outpatient clinics reserved for daily use by patients (Arkiv, 2023).

Malatya province is located in the upper Euphrates basin in the Eastern Anatolia region of Turkey. Data from the meteorological station of Malatya show that the average annual temperature is 13.7 degrees (7-8 degrees in winter and 26-28 degrees in summer) (Sunkar et al.2013). The temperature difference between the seasons is too great in the province, so that the temperature drops to -30°C in winter and rises to 42°C in summer. The rainiest season in Malatya is spring and the average rainfall over the last ten years was 359.9 mm. It rains very little in

Malatya in the summer months. The prevailing wind in Malatya blows from the southwest. Although the wind direction varies in summer, the winter winds come from the southwest, south, north and northwest. The province has been under the influence of a significant drought in recent years (Ateş & Sabaz, 2013), which has led to a massive decline in fruit production in some areas. Due to the severe summer drought in Malatya, humidity remains at a very low level (Hatun, 2010).

METHODOLOGY

This study consists of three basic phases. The method consists of four consecutive steps: (1) a literature review to determine the design criteria of healing gardens, (2) analysing the case study, (3) identifying the evaluations and needs of cancer patients and experts, and finally (4) developing a list of design strategies based on the data obtained in the previous steps.

Site Survey and analysis

There are several balconies and terraces on the main building of the IUOH. Two balconies are located on the south side, and two are located on the north side of the building. The existing balconies in the building were closed to users and had no active function at the time of the study. For this study, two balconies on the south side of the building were selected as a suitable area to create the garden (Figure 3). The reason for choosing the balconies was their location, as they receive suitable southern sunlight. In addition, both balconies were primarily planned as dedicated areas for patients on the floors on which they are located. In this way:

- Balcony 1 (B1) with an area of 55.41 m² is located on the second floor. The second floor belongs to the Department of Pediatric Hematology and Oncology and 1 accommodates young patients aged 3-18 years.
- Balcony 2 (B2) on the fourth floor belongs to the Medical Oncology Department and is used by adult cancer patients aged 18-54 years suffering from one of the following cancers: lung cancer, head and neck cancer, breast cancer, prostate cancer, esophageal cancer, stomach cancer, colon cancer, ovarian cancer and cervical and uterine cancer. The area is also 55.41 m².

Prior to the design, environmental analyses of the selected balconies were carried out. Traffic, sun exposure, wind, and noise analyses of the areas were carried out as part of the study. Once all the analyses had been carried out on site, a SWOT analysis was conducted to identify the internal strengths and



Figure 3. Inonu University Oncology Hospital Area Analysis. (Arkiv, 2023).

weaknesses as well as the opportunities and threats of the area. During the field inspection and on-site analysis, some photos were also taken in the study area for later evaluation.

Interview and questionnaire

Two types of interviews were conducted in this study to determine the users' preferences and needs as well as users' evaluations of the site. First, a face-to-face interview was conducted with the patients, the officials and the patients' companions. In cases where an interview was not possible due to the patient's health condition, the questionnaire method was conducted with the patients or their companions. The questions consisted of two parts. In both the interviews and the questionnaires, the first part of the questions related to socio-demographic characteristics and the second part contained questions about the research topic and the hospital environment. For example, participants were asked what problems they have in the hospital garden, whether they spend time outdoors in the hospital, how often they spend time there and what outdoor activities they do there, etc. The indoor and outdoor conditions of the hospital building were also evaluated by the participants in terms of design, user-friendliness and landscape. The questions were answered by 50 people who were cancer patients or their companions who were treated in this hospital.

The survey was also conducted with the participation of doctors, nurses and administrative staff. The interviews with the medical staff were conducted with 10 experts. The aim of this survey was to propose and design a suitable indoor space as a healing garden in the hospital building for cancer patients who are being treated in the hospital for a certain period of time and also for other hospital users, who are dealing with the cancer of their relatives.

Design proposal for the hospital garden

In the final phase of the study, a proposal for the design of an indoor garden specifically for people with cancer was developed based on the findings from the literature review, the field analysis and the assessments of patients and users of the hospital. In this phase, computer software such as AutoCAD 2021, Adobe Photoshop 2021, Sketchup 2021 and Lumion were used to create the design layout and transfer it to the digital environment.

RESULTS

Site Analysis

The results of the location analysis have shown that:

- The hospital is easily accessible by public transport. The buses, which are the main transportation system to almost any point in the city, pick up passengers from the main entrance of the university campus to the hospital and back. The main entrance to the hospital is located in the southwest of the building. There is also a research entrance in the northern part of the building and another entrance is located to the west of the medical school building to the north of the hospital.
- There are plenty of places for staff, students, patients, and their companions to meet their food, drink, and shopping needs. However, there is no accommodation on campus for the carers of patients undergoing long-term treatment. As a result, the patients' companions are accommodated in their vehicles or in the recreational areas in the hospital's garden.
- The hospital building consists of 6 floors and the total area is 30,000 m². The problems with daylight on the first floor and basement and their intensive daily use were overcome with the help of recessed courtyards. The spatial system with recessed courtyards has provided all rooms on the first floor and in the

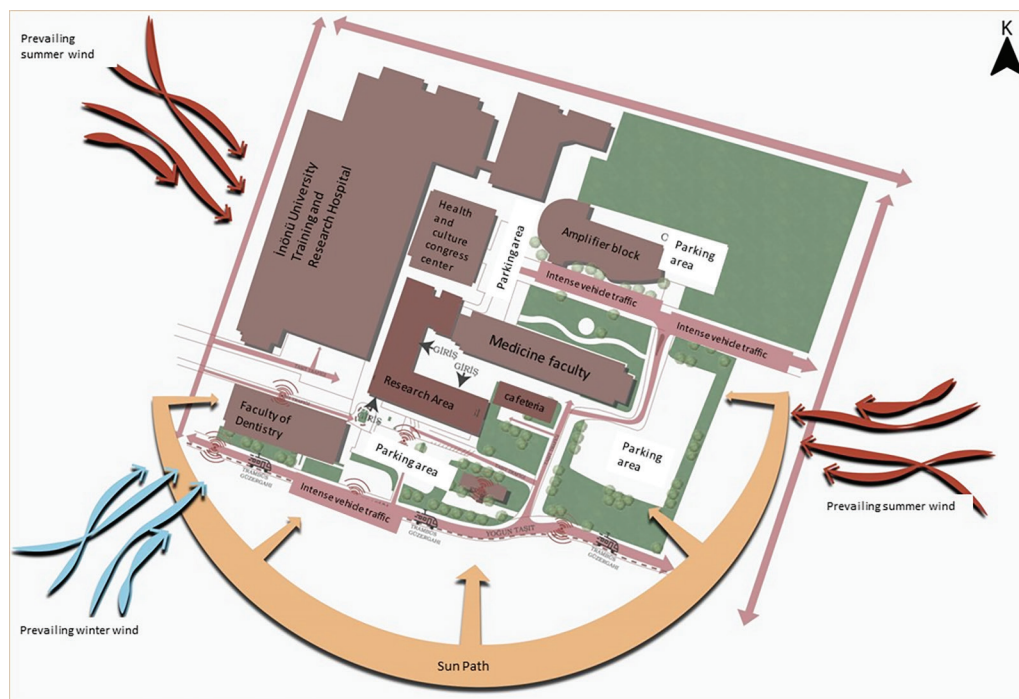


Figure 3. Floor Analysis of Balcony 2 (reproduced by authors).

- The sun's rays complete their orbit at an oblique angle with a short range in winter and at a right angle with a long range in summer. Therefore, the sun's rays are more noticeable in the summer months, especially between 11.00 and 15.00. As both balconies are on the south side, they receive direct sunlight. It has been shown that the shadow length changes as the angle of the sun decreases in winter and increases in summer.
- As for the balconies, balcony 1 is located on the second floor where the pediatric hematology inpatients are located, so it is easier for the young patients to reach balcony 1 without having to go to another floor. It has a drainage problem. Balcony 2 on the Medical Hematology floor (floor 4) is easier for adult patients to reach without having to go to another floor. Burnt granite was used for the floor and composite panels for the walls.

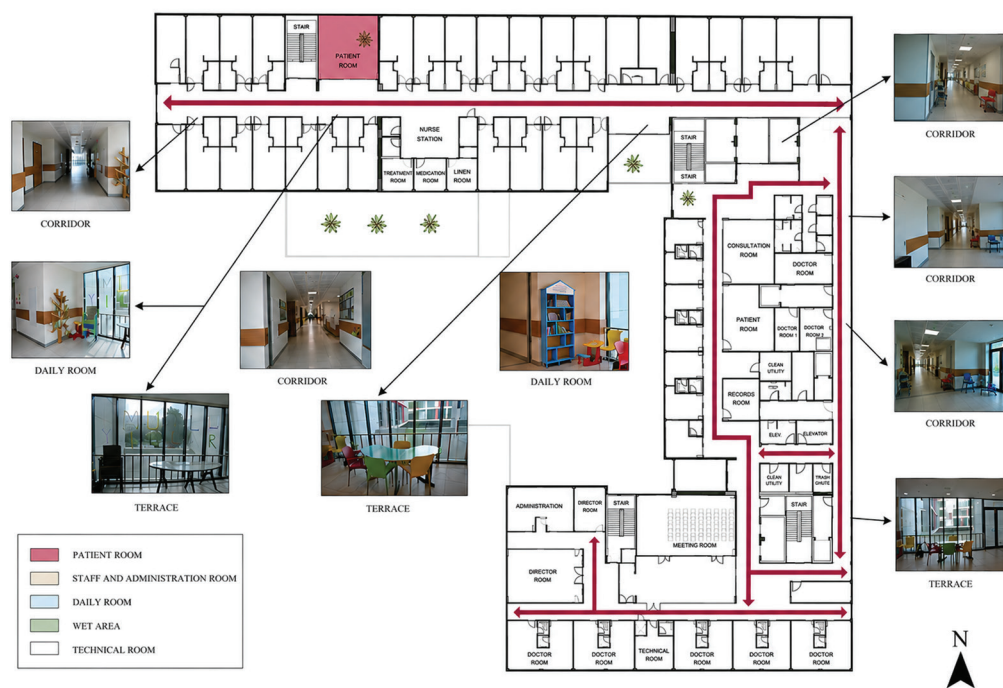


Figure 4. Floor Analysis of Balcony-1 (reproduced by authors).

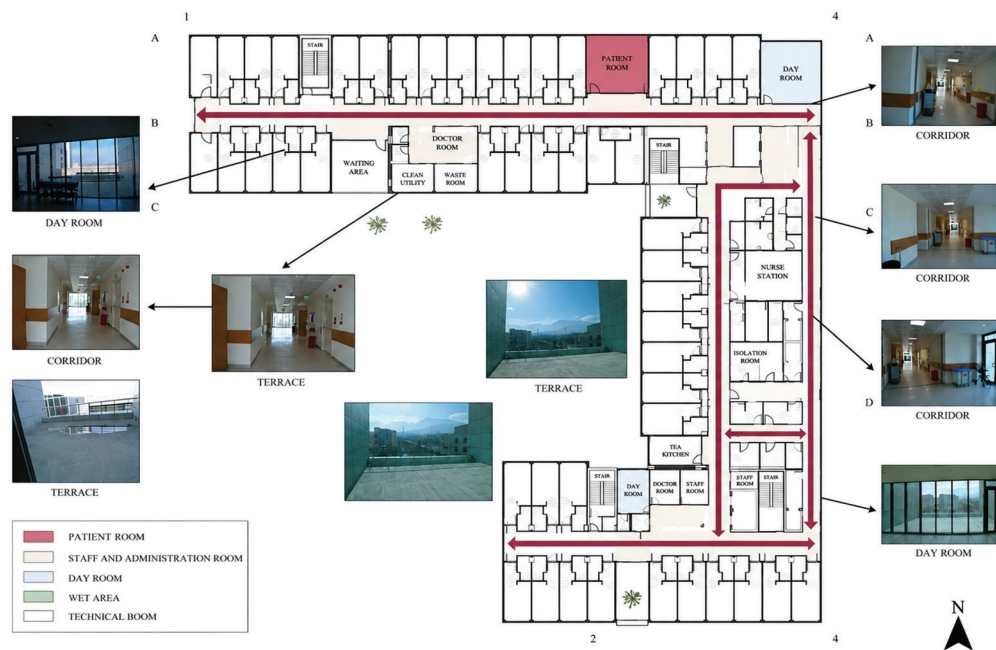


Figure 5. Floor Analysis of Balcony-2 (reproduced by authors).

SWOT Analysis

The SWOT method was used to identify parameters such as strengths, weaknesses, opportunities and threats in relation to the study areas (Table 2).

	Strength
S1	The hospital was built using new and modern technology.
S2	There are many balconies in the building, and the corridors are wide, spacious, and sunny.
S3	It has easy access from the city center to the university where it is located.
S4	There are no problems with navigation and movement within the hospital.
S5	Sufficient car parks are available for the hospital.
	Weakness
W1	There is no garden in the area;
W2	There is no space for gardening near the hospital building;
W3	The number of medical staff is not enough in the hospital;
W4	The silhouettes seen from the balconies do not have beautiful views;
	Threats
T1	The proximity of the oncology hospital to the Inonu University research hospital and the presence of common corridors through the building to the research building will negatively affect the use of the gardens designed for cancer patients.
T2	User profiles will vary, and the space will be insufficient. Since the front parts of the balcony areas are open, there is a danger of excessive sun or wind exposure for these balconies.
	Opportunities
O1	If access to the hospital and directions in the building are provided well, the hospital gardens will be easy to access.

Table 2. SWOT analysis of study areas (source: authors).

Users' Evaluations Patients and their caregivers

- When patients and their caregivers were asked to rate and rank the physical conditions of the hospital, they cited lack of open space (38%), lack of sun (22%), airlessness and dust (14%), and overcrowding (8%), as well as problems with cleanliness (8%), transportation, and accessibility (5%) as the most critical aspects of the hospital. In addition, 85% of patient rooms have windows, while 55% of rooms receive no sunlight. According to the responses, the main problems at the hospital are the length of treatment (53%) and the long stay at the hospital (45%).

- In terms of patients' physical abilities, almost all patients and accompanying persons (caregivers) stated that they were unable to go out. 37% of the participating patients stated that being outdoors has a physical effect, 35% stated that it has a psychological effect, and 28% stated that the social effect of open spaces has a healing effect.
- Regarding a new hospital garden, 42% of participants stated that they do not want noise and sound, 30% of them do not want scented plants and 28% do not want wobbly furniture elements. It is clear from the participants' responses that they expect a hospital garden to be primarily a quiet area (32%) and secondarily a green and recreational area (30%). Then, an educational area (10%), a meeting area (7%), a place to follow part of their treatment in the garden (7%), and an area for walking and sports (6%) were the preferences for the hospital garden.
- 81% of participants did not want the hospital garden to be far away from the hospital. According to the responses, the main problems of cancer patients in the hospital garden could be the sun (42%), the temperature (23%), the soil (21%) and the plants (14%). 75% of patients stated that they were treated as inpatients and 25% stated that they were treated as outpatients.
- As cancer patients are isolated in hospital and spend long periods of treatment in hospital, it has become very important that patients' rooms have open green spaces or even a window to nature. The survey of nursing staff revealed that when patients are placed in a room without a window, they refuse and demand a room with a window. It was found that fresh air and the countryside are very important for cancer patients to feel well and make the most of the day.

Experts (doctors, nurses, administrative staff)

- The staff survey revealed that 32% of participants would like a green space and recreation area, 22% a place to read, 11% a quiet place, 8% to use the garden as a place to learn, 7% an area to walk and 3% the opportunity to carry out some of their treatments in the garden.
- When staff were asked about the negative physical conditions of the hospital, lack of open space (34%), lack of sunlight (25%) and stuffy air (25%) were the most critical. The least critical issues were overcrowding (12%) and problems with cleanliness.
- 45% of participants stated that they go to the canteen during their break, 19% of them go outside to get some fresh air, 17% rest in their room and 9% smoke.
- According to the surveys, 74% of employees' rooms have no window, while 26% of rooms have a window. 65% of staff do not receive sunlight in their rooms. The main problems cited by healthcare staff were the impatience and restlessness of people accompanying patients who were worried about the patient's situation (52%) and, in second place, the psychology of the patients themselves (41%).
- Similar to patient responses, 73% of staff stated that the hospital garden should not be outside the hospital building. Healthcare staff indicated that sun (38%), temperature (29%), soil (18%) and the presence of plants (15%) in hospital oncology gardens could have a negative impact on patients. Staff also stated that the negative aspect of being in open areas for cancer patients is the large number of people (63%) and sensitivity to allergies (35%).
- According to staff responses, 38% of cancer patients should wear a mask, 33% should wear gloves (33%) and 29% should avoid being in crowded open areas (29%). They stated that it is psychologically beneficial for cancer patients to stay and spend time in the garden of the hospital during treatment.

- 75% of healthcare staff stay in hospital for 12 hours a day and 25% of them for 8 hours. Regarding the length of hospitalization of cancer patients, 64% of the staff stated that they stay in the hospital for 1-2 months and 36% stated that they stay for 21 days. The staff stated that the side effects of treatment in cancer patients are 41% weight loss, 32% hair loss and 27% sores on the corners of the mouth.

Indoor Garden Design

As a result of this study, a design proposal was developed for two balconies of the hospital building. Based on the literature study, the field analysis and survey as well as the interviews, some important criteria and design guidelines were developed.

According to the literature studies, a hospital healing garden:

- Should create a sense of place and a stress-free environment through a unique and original design;
- Should have a vision for the outdoor spaces of the hospital;
- Should include a variety of private, semi-private and shared spaces to cater for the different user groups with their varying needs;
- Should be accessible to disabled and wheelchair users. Walkways should be wide enough for wheelchairs and doorways should be wide enough to allow easy maneuvering;
- Should have minimal height differences in the surrounding area to be easily negotiable;
- Should have non-slip surfaces with handrails and seating at short intervals for users with reduced mobility.
- Should be designed in such a way that the senses of sight, hearing, smell, touch and taste are incorporated into the garden.

The analysis and survey results of the area showed that:

- Sunlight is strongest in areas at midday, so it is important to take precautions when designing the area to protect users from sunlight.
- The prevailing winter wind from a south-westerly direction can particularly affect the use of the work areas.
- Since the winter months in Malatya are cold and snowy, it is very important to close the front of the balconies in winter.
- Since the areas of the balconies are small, the features of the garden should be carefully planned and placed according to their importance.
- The maximum weight of the balconies in the hospital, which is 9800 kg, should be considered.
- Hospital managers should actively participate in the design of these outdoor spaces by giving hospital staff the opportunity to learn about the healing effects of the gardens and promoting the use of the outdoor spaces.

The results of the interviews and questionnaire showed that:

- Children with cancer want a place to relax away from the hospital environment.
- A comfortable environment can be created where hospital staff can sit and have a drink in the hospital garden.
- Giving patients the opportunity to continue their social roles was one of the patients' wishes.
- Increasing the feeling of independence and freedom was one of the patients' wishes.
- It was recommended by expert doctors to use healthier materials, away

from carcinogenic substances, in the field.

- Sight is one of the most important senses. There should be a view of the natural areas from the patient rooms.
- The garden should use a variety of textures, colors and shapes to attract users' attention and make them linger.
- The representation of the seasons is extremely important for understanding the passage of time and the life force to which we are all connected. This can be accomplished through the blooming of seasonal plants in the spring and the changing foliage of trees in the fall.
- Color is another aspect of visual sense. Color evokes a variety of emotions in different people, such as excitement, alarm, calm and positive feelings.
- Unpleasant sounds should be avoided by utilizing the pleasant sounds of nature in the environment. The chirping of birds and the movement of leaves in the wind provide a positive stimulation of nature.
- Depending on the condition of the outdoor space, wind chimes can be used to create a lively sound that does not reflect the hospital environment.
- An organized, legible and attractive space reduces stress, enhances the enjoyment of being in the garden and reduces cancer patients' fear of getting lost.
- Plants and flowers should reflect the seasonal changes, and the variety of texture, form and fragrance of plants should be considered to avoid uniformity.
- Different sunny and shady areas should be created in the garden to provide protection from wind and rain.
- Some unique art objects and esthetic landscapes can attract the attention of patients.
- Clear signs should be placed near the main entrance of the gardens to guide visitors.

The information leaflets for patients should also include a map of the garden with all the facilities and options that can be offered in the garden.

Functional plan

In this study, the proposed functions and their relationships were drawn using bubble diagrams. The functions proposed for the Healing Garden for Children with Cancer in Balcony 1 are divided into three types of areas: the rest or sitting space, the green space, the play or activity area, and the green wall. There are sculptural objects, sound objects, areas where groups can sit alone, colorful artistic walls, a vertical garden, planter boxes, an ornamental pool in the middle and quiet green areas also in the garden for children. The activity area, located on the right side of the balcony from the front door, was created to bring a small number of children with cancer together where they can play games at an active-passive table. The plan is for this area to allow children, their family members or doctors and even people who use wheelchairs to sit comfortably and spend time together.

Similarly, the functions for adult cancer patients on Balcony 2 on the fourth floor are planned in the form of seating areas, semi-covered seating and green areas where people can sit alone or in groups. This area is separated by barriers. In this garden there is also a vertical garden, plant boxes and an ornamental pool (Figure 7). The artificial vertical green wall in the garden was built at the request of the patients who took part in the surveys. The presence of landscaping and green spaces can be beneficial in terms of their healing effect.

In the hospital garden, the ratio of greenery to paving should be around 7 to 3 to make the area feel more like a garden than a square. In this garden, this ratio is achieved through vertical landscaping. As the area is too limited, the most optimal use of space including important functions was preferred

Design strategies

- Taking into account the physical and health situation of cancer patients, some specific design strategies were considered. For example, according to specialists, patients taking certain cancer drugs should avoid the sun, so shade umbrellas should be placed in the garden during the summer months. Some patients may lose muscle mass, so the presence of cushions makes sitting more comfortable for them. Some patients feel weak or may be elderly. For them, benches with backrests and armrests should be considered to make it easier for them to get up from a sitting position.
- There is a wide range of seating and furniture available in both children's and adult patients' gardens, all made from wood. Not only is the design of the seating and furniture important, but also how it is placed. Some people prefer to sit alone or with a friend in a private place. Some have just started treatment and feel weak and need to rest before going home. Low walls that divide the room into multiple areas can easily turn a space into a semi-private alcove. Also, some hospital staff may want to hold an informal meeting with patients outside or have lunch together in the gardens.
- Garden patches for cancer patients should be chosen carefully. Patients taking certain medications may be bothered by the glare of the materials. The suggested paving materials to reduce or eliminate the glare problem are light-colored concrete, such as the light gray-brown paving stones. It is also suggested that all furniture in the two gardens be made of wood, which has a lower reflective potential. Designers should stay away from tables made of steel or aluminum, which are highly reflective. In addition, soft flooring must be used in the nursery so that young patients do not injure themselves if they fall due to their treatment effect.
- To take advantage of the healing effect of water, both in terms of sight and sound, an ornamental pool was planned in the middle of the two gardens. The water basin in balcony 1 should be high up so that the water cannot be touched, as there is a risk of germs or microbes accumulating in the water.
- Discussions with doctors have shown that cancer patients receiving chemotherapy and radiotherapy should not be directly exposed to the sun, as this has a negative effect on them. For this reason, parasols and umbrellas have occasionally been used to avoid the harmful effects of the sun.
- According to surveys of patients and staff, the greatest wish for the inner garden was that it should be a quiet and green place. However, in some parts of the garden, artificial plants are preferred to avoid the risk of mold, fungi and infections which could be transmitted to patients through the soil. To give the impression that the patients on balcony 1 are in a green area, vertical green walls were used. The vertical green wall consists entirely of artificial plants, and the plant species chosen in this location are visually aesthetic, provided that the materials used do not contain carcinogenic substances.

DISCUSSION

The aim of this study was to create the hospital healing garden for cancer patients within the IUOH and to develop a corresponding design proposal. The healing properties of nature for cancer patients were discussed and suggestions for the design of the hospital garden were developed. This research has sought to define the healing role of hospital designed gardens, particularly for cancer

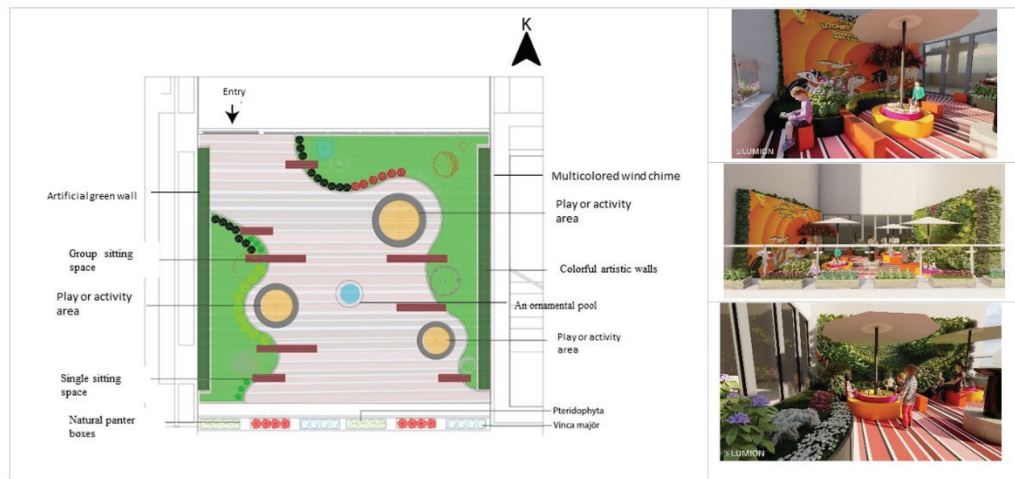


Figure 6. Indoor Garden Design Proposal in Balcony 1 (produced by authors).

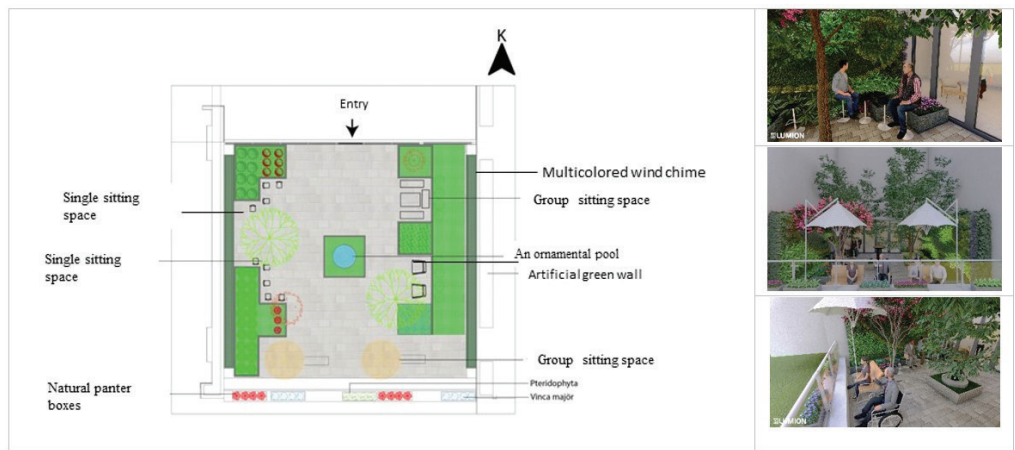


Figure 7. Indoor Garden Design Proposal in Balcony 2 (produced by authors).

patients, and to determine the dimension of enhancement. It is anticipated that designers and architects will benefit from the results of this research in their new design projects for people with illness and cancer.

In the design of this hospital garden for cancer patients, some strategies were considered that take into account the health condition and physical situation of the patients, which was explained in the results of the article. The functions recommended for the balconies inside the hospital were selected according to the needs and wishes of the cancer patients and the doctors' comments: Seating area, activity area, areas for sitting alone and in groups, an artificial green wall, plant boxes and a central pool. An effort was made to create a space different from the hospital environment to reduce patient stress by creating a calm and open area that utilizes the therapeutic values of natural elements.

The acceptance of the healing role of gardens in Turkey, not only for patients but also in general, is a phenomenon that needs to be developed institutionally. Some of the reasons for the lack of development in this regard are related to the educational and cultural structure as well as the financial situation of the country. However, the topic of "Hospital Garden" can be included in the framework of the "country's health system" and developed in a broader and more specific area from a scientific point of view. Therefore, non-governmental organizations, associations and foundations, local governments, state and social institutions, military institutions, volunteer organizations and universities in Turkey are encouraged to work on this issue. Significant improvements can be achieved in both economic and health terms.

In Turkey, there are only a few health institutions that have an oncology department and IUOH is one of the most well-known oncology centers in the country. Therefore, the establishment of such an indoor garden can be a good model for other health centers. However, the planning criteria cannot be met with a single design case. Depending on the economic potential of the hospital, the available open spaces, the needs of the patients and other aspects, the optimal design should be considered. The healing gardens of a hospital require a comprehensive approach to planning and design in order to take into account all economic, physical and social aspects.

There are various aspects of the design that need to be studied with regard to the needs of the patients and the site conditions. Different types of patients of different ages, with cancer or other diseases, may have specific needs for staying in open spaces. In outdoor gardens, where the available space is large, designers plan different ideas and functions, but in indoor gardens the space is small and functions are carefully prioritized. As this study shows, in some parts of the garden, artificial planting was preferred because it was not possible to use natural plants. Or the sound of water, nature and birds. From this study, it appears that a green and quiet garden is something that cancer patients need the most. Therefore, one should try to eliminate the noise in this place and create a green place with natural elements such as plants and water.

The challenge in creating these gardens is to address the physical and health issues of the patients in the area. Considering the specific medical and health needs of the patients, designing them in practice becomes an arduous task. However, providing a place where an average portion of the users' needs are met can be acceptable as a first step. The management and care of the garden is another issue that should be investigated, as the enormous amount of maintenance can lead to a place that no longer has its original quality, form, beauty and healing properties.

Another issue that should be investigated is the evaluation after use. The patients' comments and their mental and physical behavior can be observed and studied after a few months of using the place to verify the positive effects of the garden on the patients and the achievement of the project's objectives. This is very important as these results will provide valuable information to improve the design approach and other physical aspects of the garden to enhance its healing effects.

CONCLUSION

In fact, the health center is expected to address patients' psychological needs as well as their other physical health needs. As studies have shown, nature plays an important role in alleviating stress and panic through its healing effect on the human psyche and mind. The hospital's green and open spaces inside and outside the building are crucial in this regard. However, given the physical situation and health problems of patients, especially cancer patients, it is not practical in most cases to use the outdoor green spaces, which are usually overcrowded. In addition, due to the sensitivity of their immune system during chemotherapy treatment, they mostly live in the hospital environment. The idea of creating indoor gardens in the hospitals is one possible solution to the problem. Hospital balconies or terraces or even places on the roof can be considered for creating such a green and peaceful place. As easy as it looks to design these small areas, there are several aspects related to the patients' health needs that make designing the garden a difficult task. They should be created based on the health and physical conditions of the patients, otherwise

the created garden cannot be used by all patients of the hospital. All plants, materials and physical elements such as benches and furniture should be carefully selected according to the needs of the patients during the treatment period. However, there are other aspects that will be examined later after the space use, by frequent monitoring, and objective and subjective evaluation. Social and economic aspects of this garden should also be considered in future surveys. Although there are no specific guidelines and design guidelines for the design of these indoor gardens, with more experience, a complete list of regulations and design principles can be achieved through an integrated and multidisciplinary approach.

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The City as Design Agency: Integrating Design Thinking with the Political Form of Architecture

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Abstract

This study investigates the political dimension of architecture and urban design, focusing on their potential to act as instruments of critical resistance within contemporary governance structures. The research problem centers on the tendency of architects and planners to operate within neoliberal frameworks, which reduces design to a technical and managerial function, limiting its capacity to foster solidarity, social justice, and environmental responsibility. In response, this study examines how design agencies -emerging institutional actors in urban governance- can reposition architecture as a form of political action rather than merely delivering projects. To address this problem, the study hypothesizes that architectural and urban design practices must be reframed through principles of ethics, solidarity, and social repair. It argues that design agencies can develop transformative models that prioritize public benefit and spatial quality, thereby challenging the homogenizing logic of neoliberal urbanization. Methodologically, the research adopts a qualitative and comparative approach, analyzing global examples of design agencies to examine the relationship between spatial form production and modes of political representation. The theoretical framework draws on Ungers's "City within the City" and Pier Vittorio Aureli's notion of "absolute architecture." These theories provide a lens for understanding how formal autonomy and antagonistic resistance can be institutionalized through design agencies. Ultimately, the study interprets these agencies not as administrative instruments but as urban apparatuses capable of generating political consciousness through spatial form.

Keywords: Absolute Architecture, Design Agency, Design Thinking, Dialectic City, Urban Design.

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INTRODUCTION

Throughout history, architecture has been concerned with the shaping of social relations as well as the aesthetic organization of space. In today's urban political economy, this shaping power largely occurs within the framework of neoliberal boundaries. The disciplines of architecture and planning serve the rule sets of the capitalist logic that create these boundaries. Within this framework, the role of architects and planners has often been considered merely as technical consultants, while their forms of political production have been overlooked. This study focuses on design agencies due to their role in representing emerging institutional mechanisms that bridge design thinking and governance. Unlike traditional planning bodies, these agencies operationalize collaborative and iterative approaches, enabling architecture and urban design to regain their political and ethical roles. By mediating between policy-making and spatial production, design agencies provide a platform for challenging neoliberal urbanization and fostering public benefit, solidarity, and spatial justice. This study examines the disciplinary potential of architecture in terms of the production of political action, connecting the theories of Ungers and Aureli with contemporary structures such as design agencies.

According to Aureli (2011), Ungers addressed the city as a mosaic of differences and a system of formally autonomous yet structurally related "islands." Ungers's understanding of "rational form" positions architecture not as a means of political representation, but as a formal framework organizing decision-making mechanisms (Aureli, 2011). Drawing inspiration from Ungers's approach, Aureli, in his work "The Possibility of an Absolute Architecture" (2011), defines the political aspect of architecture through a formal antagonism. For Aureli, urban space should be the material ground of resistance against hegemonic modes of production. In this sense, Aureli's concept of "absolute architecture" demonstrates architecture's potential to resist the system by remaining within it (Aureli, 2011). When these two approaches are brought together, this study argues that design agencies today have the potential to, on the one hand, continue Ungers' formal system rationality and typo-morphological approaches in urban interventions and on the other hand, transform these intervention spaces into a political production field framed by Aureli's concept of "absolute architecture."

Therefore, the aim of this study is to examine how structures such as design agencies that exist in various global cities mediate policy-making processes through the production of urban form. The study hypothesizes that these institutions are not merely structures that oversee spatial quality, but rather actors that represent contemporary equivalents of Ungers's concepts of formal autonomy and Aureli's concepts of political antagonism. Furthermore, the study argues that through the actions of these structures, architecture can gain a critical and public position within governance mechanisms. The research questions guiding the study are as follows:

- How do design agencies function as political actors in today's cities and can these agencies re-establish architecture's capacity for political representation through this function?
- Can architects, urban designers and stakeholders, through structures such as design agencies, move towards an ethical and responsible approach towards the communities they work in?
- How can these structures develop opposition or critique of existing power relations through Aureli's theory of "absolute architecture" in the context of today's political, social and environmental crises in spatial decision-making processes?

The research is based on a policy approach that combines theoretical analysis with comparative examples. In the first stage, the theories of Ungers and Aureli were examined, defining the formal and ethical dimensions of the architecture-politics relationship. In the second stage, the institutional structures, political status, and spatial production modes of design agencies across different world cities were compared. In the third stage, these data were read in conjunction with Ungers's "form as strategy" and Aureli's "form as resistance."

This method extends the political meaning of formality to the institutional scale, demonstrating how architecture can serve as both a tool of power and a form of critique through structures such as design agencies in contemporary cities. Ultimately, this study conceptualizes design agencies not as administrative structures but as institutional forms that produce policy through spatial form. Linking these structures to the theories of Ungers and Aureli transforms these structures into sites of political consciousness production in contemporary architecture. Therefore, design agencies are considered contemporary actors remaking the political form of architecture.

URBAN DESIGN AS A SCALE OF TRANSFORMATION BETWEEN ARCHITECTURE AND PLANNING

Lefebvre (2009) argued that the modern individual fears uncontrolled spaces and tends to suppress the spontaneous and unpredictable aspects of life in their quest for rationality and order. This demonstrates that modernity is not freedom, but rather an order that produces control through abstract systems and norms. Architecture and urban planning practices, as an extension of this approach transform policies aimed at social order into normative systems at the spatial level. Cities, as a reflection of both individual interventions and collective relations, constantly experience the tension between individual freedom and social control (Tatlıç, 2019). The physical structures of modern and contemporary cities have a practice that restricts individual freedoms and increases social constraints and democratic discourses that theoretically recognize differences paradoxically lead to spatial homogenization in cities (Tatlıç, 2019). Consequently, diversity transforms into a regulated homogeneity. Modern architecture is often implemented as a closed system where all decisions are made by politicians and designers with a holistic and comprehensive design approach (Tatlıç, 2019).

Sennett in 2007 (as cited in Tatlıç, 2019), identified modern planning's greatest problem as its production of "predetermined forms," and argued that when experimental possibilities are suppressed in the name of "order," urban imagination and vitality are lost. Similarly, Jacobs (1961) argued that rigid control in urban planning conflicts with life and vitality, but rather urban order should emerge from people's own experiences and perspectives. Within this framework, the "open" design approach, which emerged in the 1950s and 1960s as a reaction to authoritarian planning and functionalism, granted users the right to make decisions, placing user freedom at the center of architectural decision-making processes. Freedom and participation in architecture are political and social issues related to the social meaning of space. Participatory approaches which make architecture a "continuously negotiated process," demonstrate that architecture has the potential to transform not only the form of the built environment but also the form of social life (Tatlıç, 2019).

This potential offers the opportunity to mitigate contemporary problems such as the climate crisis, rising inequality, and the commodification of urban space. Under the influence of neoliberal policies, cities have been instrumentalized for

capital accumulation and value extraction, deepening social injustices and ecological destruction (Kline, 2023). Urban design has evolved significantly since the mid-20th century incorporating methods such as formal analysis, public space experimentation, infrastructure systems, and regulatory frameworks. However, these methods, integrated into neoliberal urbanization processes have often served capital-driven transformations. This limits urban design's capacity to produce social and ecological justice (Kline, 2023). Because cities are shaped by political decisions and an economy based on resource exploitation, considering their future requires not only physical but also political and ethical redesign (Kaput, 2022). In this context, urban design must be reoriented to support "commoning" processes that defend citizens' collective rights and access to resources against the controlling tendencies of the state and the privatizing tendencies of the market (Kaput, 2022; Kline, 2023).

Within the framework of neoliberal policies, the private sector generally operates with the primary aim of generating short-term profits in urban interventions. Bento and Laopoulou (2019), argue that the market alone cannot produce high-quality urban environments. Public intervention is a legitimate response to market imperfections. However, public interventions in design have been criticized as subjective and restrictive. Bento and Laopoulou (2019) counter this criticism by arguing that design approaches should be evaluated from the perspective of the quality of public life and these approaches should be grounded in the principle of public benefit. Therefore, despite the decline in state authority in the neoliberal era, this approach suggests that the state should maintain its role as a leader and create a culture that promotes quality (Bento & Laopoulou, 2019). In this context, the changes in participatory political theory that occurred during the transition from government to governance also necessitated the renewal of the means of producing urban space. During this transition, the state shifted its approach from direct control role to a management style based on negotiation, persuasion, and collaboration (Bento & Laopoulou, 2019). In this policy shift, urban design, as a scale operating at the intersection of planning and architecture transfers the intervention of political decisions to urban space. During this transfer process, the level of relationship between governance policies and design directly affects the quality of space.

Urban design governance is a multilayered, multi-actor governance process in which public and private actors collaborate to jointly make and implement decisions about designing cities' public spaces, transformation areas, and the built environment. After the 1980s, the rise of critical knowledge and communicative rationality within governance networks to understand the growing citizen opposition to urban interventions implemented through neoliberal policies and to address the profound inequalities in access to decision-making processes and the complex nature of these interventions has steered representative democracy toward a deliberative arena (Legacy, 2010; Tekeli, 2023).

According to Habermas (2001), the crucial point is that decisions be made through transparent public discussion. His theory of communicative rationality frames this discussion as a deliberative arena where rational discourse among diverse actors legitimizes governance. Public space, in this sense, is not only physical but also discursive, a medium for democratic participation and the negotiation of power asymmetries. This perspective is crucial for urban design because it positions spatial interventions as tools for fostering dialogue and inclusivity, rather than reinforcing hierarchical control. Design agencies operationalize this principle by institutionalizing communicative rationality into governance structures. Through participatory workshops, iterative design

These deliberative and collaborative approaches expand our perception about environment from using the dominant tools of economic interest, science, and technology, toward affect, connections, and encounters. This expansion creates the opportunity to open up spaces for planning and design by increasing the number of actors seeking innovation. Therefore, this process involves expanding the innovative space (Tekeli, 2023). Although occurring in different contexts and conditions, transformation practices shaped by the dominant, economically focused logic of neoliberal policies often produce homogeneous spatial morphologies. However, this innovative space shifts toward urban design, where the scope of design intervention expands (Figure 1).

The diagram illustrates a transition from traditional management to design thinking in urban form. It is divided into two main horizontal sections: the top section for traditional management and the bottom section for design thinking.

Traditional Management (Top):

- homogenization of urban form** (left header)
- traditional management** (right header)
- A box contains the flow: **urban design** → serves → **growth economy** → forms → **city**.
- An arrow labeled **has reached** points down from the **city** box to the **crisis** box.

Design Thinking (Bottom):

- crisis threshold** (left header)
- design thinking - design agency** (right header)
- A box contains the flow: **ecologic boundaries** → defines → **crisis** → national-global.
- An arrow labeled **requires** points from the **crisis** box to the **innovative approaches** box.
- The **innovative approaches** box contains: **innovative approaches** → reforms → **decision-making process**.
- An arrow labeled **demand** points from the **decision-making process** box to the **new political and architectural responses** box.
- The **new political and architectural responses** box contains: **new political and architectural responses** → forms → **city**.

Overall Outcome:

- An arrow labeled **preservation of heterogeneous urban form** points from the **city** box in the design thinking section back to the **city** box in the traditional management section.

Figure 1. Traditional Management and Urban Design Governance Approaches (Produced by the authors).

between theory and practice. According to Madanipour (2006), visions are developed based on global trends rather than reflecting local differences and decisions and are imposed from above rather than made through consultation with the people. Consequently, the theoretical “beauties” of urban design create contradictions in practice, transforming into a tool of intervention that capital can achieve rapid results

Urban design is often chosen at a scale for economic gain. The prioritization of certain sectors, images, conditions, and elements over others stratifies societies making it difficult to reach a consensus on a singular vision (Madanipour, 2006). Americans, Europeans, and Asians discuss urban problems within their own frameworks, however in practice, spatial homogeneity often emerges in cities. Globalization has significantly altered the architectural perspective, and countries often implement their architectural practices without considering their own unique circumstances. Globalization would systematically leave everyone rootless (Koolhaas & Kwinter, 1996). This view reveals a situation in which local contexts of cities are bypassed and homogeneous approaches to urban morphology prevail within the framework of globalization's conditions.

However, architecture can create an interdisciplinary policy through an alternative urban design approach that utilizes the potential and footprint of existing spatial structures. In this context, the “demolished-densified-rebuilt-changing social fabric” spiral of most urban transformation practice, which serves the collaboration between bureaucracy and investors can acquire a new character operating with internal socio-spatial dynamics. The most important component of this character is to bring the potential of differences and internal dynamics to the surface through urban design shifting the existing dominant transformation approach to a social basis. Throughout history, post-war devastation has presented an opportunity for urban replanning and design, prompting architects to develop alternative theories in response. Theories such as Ungers's “green archipelago,” “grossform,” and “dialectic city,” and Aureli's “absolute architecture” approach, informed by these theories are alternative moments that can be pursued in urban transformation and reconstruction.

URBAN THEORIES OF UNGERS AND AURELI: “GREEN ARCHIPELAGO”, “GROSSFORM” AND “ABSOLUTE ARCHITECTURE”

Urban transformation is both the intended purpose and the tool used in urban space interventions regarding what will be transformed. On the other hand, urban design is the method that determines the quality and aesthetics of the built environment and how it will be transformed. Therefore, urban transformation and urban design complement each other. By integrating urban design into the transformation process, physical, social, economic and aesthetic objectives are simultaneously pursued. Urban design is the design governance mechanism that ensures public quality in transformation projects. Implementing urban transformation without established urban design strategies can lead to socio-spatial problems (Heath & Tiesdell, 2013; Carmona, 2021). In this context, the morphology of the city and the user perspective are two crucial elements to be discussed in the process of transformation through urban design. From the second half of the 20th century, critical inquiries and new alternatives began to be developed regarding the relationship between architecture, the city and planning in the post-war urban reconstruction and transformation processes.

One of these is Ungers's theory, which develops ideas aimed at transforming quantity into quality at the urban design level and analyzes the architecture-city relationship through a morphological lens opposing the quantity-based,

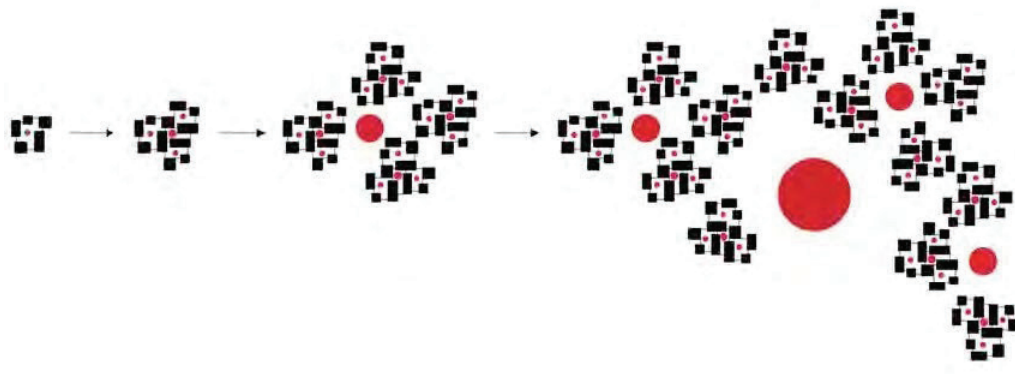


Figure 2. Diagram of negative and positive (public) spaces (indicated in red) and their incremental order in the proposal for Neue Stadt Köln-Chorweiler by O. M. Ungers. Klaus Platzgummer, Tianyi Shu and Benedict Wahlbrink (Jacoby, 2018).

infrastructure-expansion, and homogeneous spatial-production processes of urbanization. In this theory, Ungers emphasized that, as a response to the dynamics of post-war urbanization in Europe, architecture needed to engage with the city from a perspective different from that of urbanization in the production of space. Ungers's work pointed to the need for architectural thought to develop a rational approach that balances formal and socio-cultural aspects during the post-war reconstruction process.

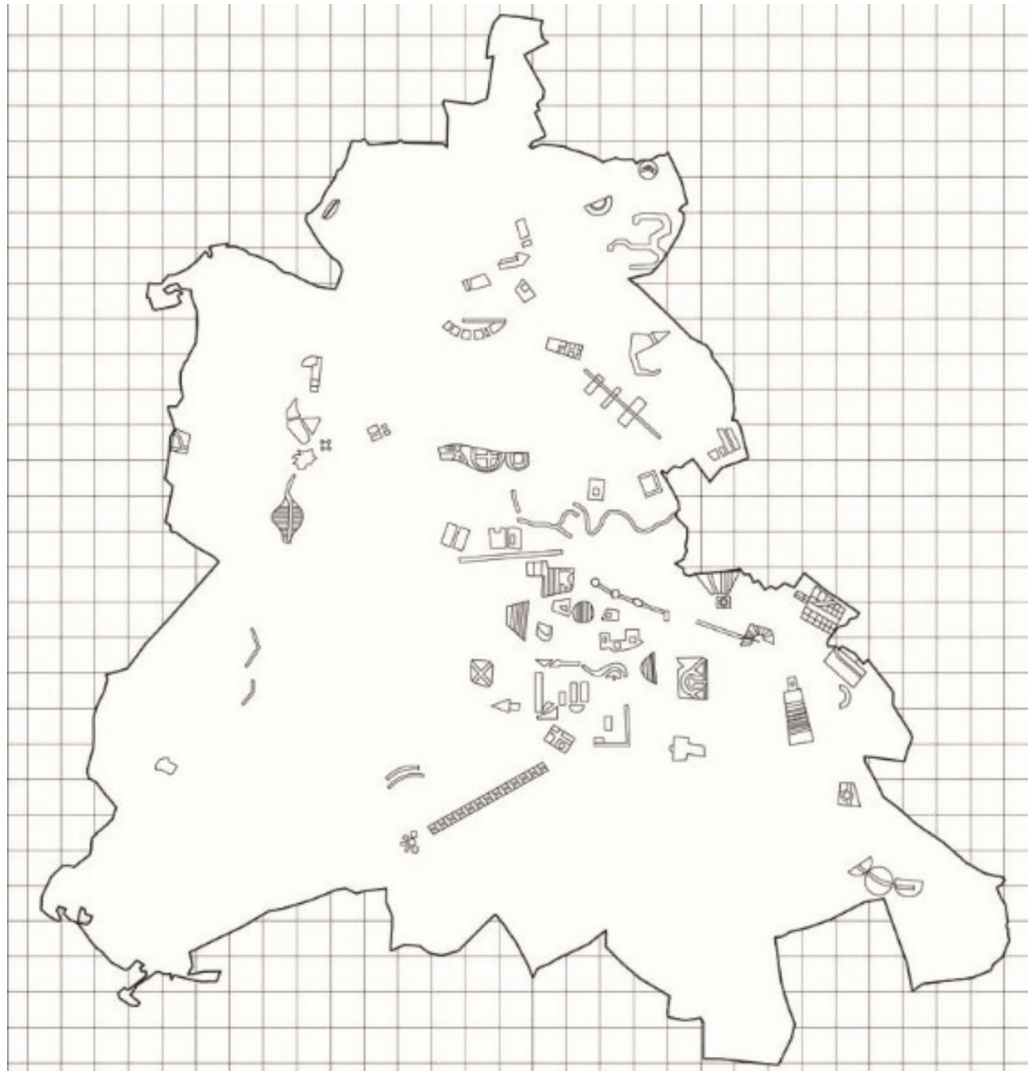
Ungers has enriched this approach with a theory that produces urban morphology and typology, contrary to urbanization dynamics at the scale of urban design within the framework of architectural formalism, with conceptualizations such as "city within the city", "dialectical object", "dialectical city", "city as a layer" and "grossform" (Figure 2).

The conceptualization of the "city within a city" intensified typological characteristics by emphasizing the autonomy and complementarity of places within the urban context. Thus, by developing a morphological gap between opposing and identifiable areas, it utilized complementary contradictions for a dynamic design framework that emphasized transformation as a process of synthesis. In this process, Berlin was viewed not as a homogeneous metropolis but as a collection of distinct urban islands, each with its own identity. Conceptualized as a "Green Archipelago" (Figure 3), this collection was envisioned as a fragmented urban landscape comprising self-sufficient development islands within a green matrix (Jacoby, 2018).

Ungers developed the concept of the grossform as the structural element of these islands and argued that large-scale architectural forms could serve as stable markers of identity in increasingly formless urban environments. The grossform functions as an urban agency for recreating a system of thought in urban conditions where traditional planning tools have become ineffective. Koolhaas (1995) argued that the 20th century had lost the struggle against quantity and urbanization produced and proliferated flows rather than form. Ungers, on this point, proposed the grossform as an organizing principle between flows and form, resisting the dissolution of form. In his "Green Archipelago" project, Ungers applied the grossform to fragmented urban conditions, idealizing a single grossform as a "dialectical object" containing multiple opposing elements (Figure 4). The dialectical object highlighted how grossform could accommodate and negotiate urban contradictions within a single unity (Hättasch, 2016).

This idea later evolved into the dialectical city conceptualization, focusing on the importance of defining and strengthening contrasting urban identities within a city. Conceptions of the "city within a city" and the "dialectical city" imply formality, heterogeneity, and the architecture-city relationship through typological and morphological explorations. Complementing this approach

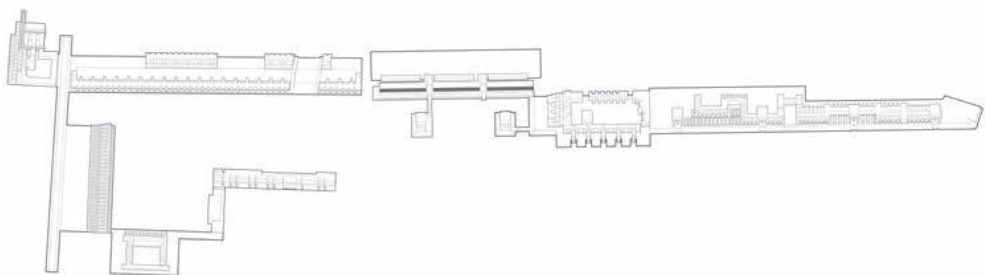
Figure 3. Where the Green Archipelago forms a federation of parts, Grossform suggest both a model for multiplicity-within-unity of each island and the reading of West-Berlin as a single "dialectic object." (Hättasch, 2016).



through urbanization dynamics, urban strategy, as a layer, is also considered in Ungers's approaches as a planning tool that brings order to the heterogeneous city, utilizing layers of infrastructure, amenities, and buildings as a contributing system and exerting control over form (Hättasch, 2016) (Figure 5).

Ungers's urban design philosophy viewed transformation as a process in which architecture, history and historical foresight coexisted, shaping it dialectically as both a tool and a design object. In this approach, architectural design created a "morphological grammar" through repetition, scaling and juxtaposition, a constant reinvention and reinterpretation of existing typological themes that reflected a deeper engagement with the social context and realities of each site. Ungers's dialectical approach viewed architecture and urbanism as dynamic, ever-evolving fields, embracing contradictions and shaped by historical forces,

Figure 4. Grossform as "Almost-Object": Ungers' Project for the Grünzug Süd in Cologne oscillates between part and whole. (Hättasch, 2016).



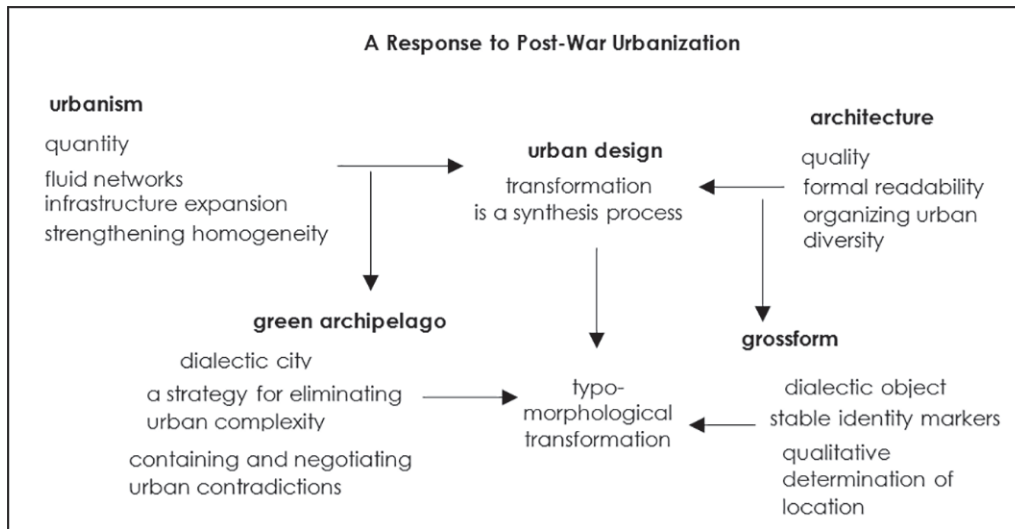


Figure 5. Ungers' Design Theory as a Response to Post-World War II Urbanization (Produced by the authors).

typological precedents, and spatial dialectics. According to Ungers, architecture should adopt an approach that fosters proactive interactions with the city and its inhabitants, rather than merely reflecting the systemic, deterministic dynamics of urbanization. (Hättasch, 2016; Jacoby, 2018).

Influenced by Ungers's theories, Aureli (2011) proposed the theory of "absolute architecture" and discussed it as a possibility. Comparing the concepts of city and urbanization, he considered urbanization as a process that erodes and disperses the concept of the city. Urbanization focuses on continuous expansion and integration, however, a city is a formation with specific boundaries and defined spatial structures. (Aureli, 2011). According to Aureli (2011) cities should adopt an "island" model, prioritizing form and boundaries, as in Ungers's approach. Architecture should create an environment of resistance at the urban design scale against the routine flow of urbanization and that architectural form, with its political character, can contribute to urban morphology within the flow of urbanization. Architecture is a political act that defines urban form through its thoughts and practices (Aureli, 2011).

"Absolute architecture" rediscovers the possibility of political formalization of the city through architectural form within the "sea of urbanization." It opposes the ever-expanding, all-encompassing logic of capital urbanization, where the social dimension is assimilated into the economy (Aureli, 2011). According to absolute architecture, urban components, unlike urbanization's integrative apparatus, offer the potential for redefinition by framing the sea of urbanization with their finite formal boundaries (Aureli, 2011). Heterotopic formations in the city that remain outside of capital urbanization are subject to approaches to incorporation into the system through exchange value under the guise of formalization. However, these areas resist this pressure with their socio-spatial potential centered on use value.

These urban fragments embody a distinct ideology shaped by the construction conditions that have prevailed since the triumph of economic optimization over political judgement within the framework of urbanization logic. Their formation is not achieved through visionary general planning, but through the elaboration of specific and strategic architectural forms and site-specific interventions (Aureli, 2011). "Absolute architecture" represents a concept of the city that, in opposition to the ubiquitous and institutionalized complexity of design, reveals the political principle of design through the material form of architecture and articulates a distinct attitude toward the urban realm (Aureli, 2011). Against

the pressures exerted by the dynamics of urbanization upon the city, “absolute architecture” opens a critical window of inquiry into the architecture of the city itself. Contrary to the contemporary “packaging” role assigned to design by the logic of urbanization, an alternative approach at the scale of urban design is required to establish a renewed political and formal understanding of the city and its architecture (Table 1). In this way, it becomes possible to expand the discursive and performative scope of architecture. It is a matter of debate what role architecture should play in the process of space production at the scale of urban design in combating the side effects accumulated by today’s conditions reached with the motto of continuous progress and growth of urbanization.

Table 1. Comparison of Neoliberal Urbanization and Absolute Architecture-City Relationship
(Produced by the authors).

Neoliberal Urbanization	The Absolute Architecture-City Relationship
Economic-Centered (socio-political arguments are assimilated into economic logic)	Socio-political and Formal (focusing on the question of the relational unity of parts and pointing to the possibility of this unity)
Integrative and Homogeneous (societal and community behaviors are managed by a single, holistic system that blurs the distinction between public and private)	Fragmented and Heterogeneous (composition of different city parts)
A General Vision and Plan (demand for the city to function well)	The Elaboration of Specific and Strategic Architectural Forms (archipelago of site-specific interventions, scale of architectural form)
Architecture’s Affirmation of the Conditions of Urbanization (a design approach that serves the functioning of urbanization dynamics)	The Possibility of Architecture to Offer an Alternative City Idea (the possibility of both shaping the city and understanding the city and urbanization through the limited nature of architectural form)
Administrative Praxis (the suppression of the socio-spatial character of the city in favor of a market-driven system))	Ontological Strategy (a strategy that must be produced and implemented based on something)

Organizing urban diversity without reinforcing homogeneity, creating a spatial foundation in an increasingly fluid and unstable urban environment, paving the way for a transition from rigid planning to a more participatory urban model and negotiating institutional frameworks for bottom-up, self-organizing urban initiatives are areas that require intensifying the relationship between design and politics under current circumstances. In this context, considering Ungers and Aureli’s pioneering theories, design-focused structures such as “design agencies” have been established in some cities worldwide to facilitate collaboration and coordination among actors to facilitate the implementation of transformation processes through urban design and the production of quality spaces.

INSTITUTIONALIZATION OF DESIGN THINKING AT THE URBAN SCALE: STRUCTURES SUCH AS DESIGN AGENCIES

Design thinking and design agencies are conceptually intertwined through their shared emphasis on collaboration, contextual awareness and iterative innovation within urban governance. While design thinking provides the methodological framework that redefines problem-solving in policymaking—from linear, top-down processes to user-centered, adaptive, and co-creative approaches—design agencies serve as the institutional embodiment of this mindset. They

operationalize design thinking principles at the urban scale, transforming abstract ideas of participation, experimentation, and cross-sectoral learning into spatial and organizational practices. Through this integration, design agencies act as mediators between political decision-making and urban form, using design thinking not merely as a creative process but as a strategic governance tool. In this sense, design agencies can be seen as catalysts that institutionalize the values of design thinking—empathy, iteration, and inclusivity—into the everyday mechanisms of urban transformation, enabling cities to respond to complex social, environmental, and spatial challenges with agility and reflection.

The Framework of Design Thinking

Design thinking is a key component of the governance network that shapes the policies of urban restructuring and transformation processes, within the context of the socio-spatial environment. Design thinking has a high potential for improving problem definition and mechanism design in governance-based policymaking processes. Design thinking has extensive experience in diversifying criteria, such as completing a project on time and within budget and focusing solely on the final value to be achieved. According to Dorst (2011) the term “design thinking” has been part of the collective consciousness of design researchers since Peter G. Rowe (1987) used it as the title of his book “Design Thinking”.

Design thinking's contribution to policymaking is its increased emphasis on the user perspective. By examining users' experiences, observing their behavior and drawing conclusions about their wants and needs, design thinking encourages policy designers, central departments and relevant institutions to work collaboratively and iteratively (Table 2). In this respect, design thinking holds the promise of assisting policymakers in creating interventions and services that improve user experience and enhance public value (Dorst, 2011; Kolko, 2015; Mintrom & Luetjens, 2016; Dijksterhuis & Silvius, 2017).

In contexts where power relations are often unequal, questions arise about how to foster an effective local culture of collaboration, create capacities to interact with the market and create local alternatives for the production and consumption of services based on shared needs. These are challenges that design attempts to address in various ways. Design collaboration can be associated with co-creation which involves stakeholders from different disciplines in the design process. It challenges top-down decision-making structures and associated power hierarchies by paving the way for mutual learning processes to discover and solve social problems (Di Salvo, 2009; Markussen, 2013; Barbossa & Wiltse, 2017).

In governments where policy and practice are inevitably structured in departmental silos, design thinking can facilitate broader discussions beyond day-to-day operational concerns, bringing together competencies and common ground at the local level. Embedding a design strategy is often about making cultural changes in an organization's thinking. This requires a gradual process. Short-term political goals neglect the maturation of this process. Effective urban interventions often involve reframing the design debate in terms of broader government (Mintrom & Luetjens, 2016; Bishop & Williams, 2020).

Table 2. Comparison of Rational Project Management and Design Thinking-Oriented Project Management, (Reproduced by the authors from Dijksterhuis, E., & Silvius, G., 2017).

Aspect	Rational Project Management	Design Thinking Project Management
problem formulation	well-defined objectives	goal setting through dialogue
criteria	fixed and objective	subjective and user-centered
method	linear and analytical	iterative
information processing	verbal and quantitative	visual, experimental
solution process	predefined and controlled	interactive learning
logic	"Get it right and do it right"	good solutions through iteration
output	optimal solution	goal setting through dialogue

Within this mechanism, designing collaboration for commoning moves between the roles of articulating problems, establishing the infrastructure of socio-material associations, and negotiating power relations (Barbossa & Wiltse, 2017). This cyclical process explores the limits of design work's interaction with communities and offers a theoretical framework that can contribute to providing solutions to problems and deficiencies encountered at every scale from an industrial product to a single building or urban fabric. To overcome the adverse conditions created by global crises, governments worldwide are establishing innovation laboratories where design methods and principles are researched and applied to complex policy issues. The role of these laboratories is to create motivation and commitment to design thinking in policymaking. Structures such as "design agencies" are design-based versions of these laboratories, focused on finding solutions to urban problems by following the theories of Ungers and Aureli.

Structures such as Design Agency

As traditional public administration gives way to governance, structures like design agencies are assuming new roles in urban policymaking and implementation. These agencies are positioned as strategic facilitators, aiming to create the conditions that enable change and its spatial nature. Design agencies, operating within or outside government undertake functions such as policymaking, consulting, capacity building, and inter-institutional coordination (Bento & Laopoulou, 2019; Bishop & Williams, 2020).

These structures are less interested in urban spatial planning and more in shaping the environment and creating conditions for positive change through complex interventions (Mintrom & Luetjens, 2016; Bento & Laopoulou, 2019; Bishop & Williams, 2020). Their primary roles and goals are to help city governments increase their effectiveness and expand the potential of design-based spaces (Mintrom & Luetjens 2016; Bishop & Williams, 2020) to investigate how good design can promote governance and improve the quality of public spaces and to identify how state-led design roles can shift development processes toward more sustainable and equitable outcomes (Bento & Laopoulou, 2019). Structures such as design agencies can facilitate broader discussions beyond daily operational concerns, bringing together local competencies and common ground in design governance (Mintrom & Luetjens, 2016; Bishop & Williams, 2020). Design operates through formal tools such as regulations, incentives, and permits and informal tools such as knowledge production, evaluation, support, dissemination and research, competitions, public advocacy, vision documents, and cultural frameworks. Consequently, the scale of influence extends from technical and project-based consulting to strategic and culture-shaping change agents. Design governance is shaped by a multitude of actors and conflicting objectives and is dependent on policy decisions (Bento & Laopoulou, 2019).

As a thought leader, the design agency opens up space for reflection by asking broader, probing questions and engaging government departments and users

in the discussion. To ensure that design agencies are not merely approving bodies but also avoid ambiguity in their actions, they must be neither fully independent nor entirely government departments. Therefore, the interplay between government objectives, professional design communities, and civil society expectations makes these organizations effective, but not always authoritative, depending on the political context and circumstances within which they operate (Bento & Laopoulou, 2019).

In recent years, various cities around the world have demonstrated their political will to embrace design as a central approach in urban interventions, using architecture as a tool for this purpose. Within this framework, since the 1990s, as European cities grappled with urban decline, economic transformation, and changes in transportation systems, strong local governance traditions in Europe, through the agency of mayors and urban architecture units, have enabled the transformation of cities through architecture and urban design (Bishop & Williams, 2020) (Table 3).

The urban renewal process initiated in Barcelona prior to the 1992 Olympics was shaped by goals such as strengthening the connection between the historic center and the coast as well as increasing public spaces. The human-scale, block-based, and public space-focused planning approach, which had been inherited since Cerdà's 1856 plan was revitalized in the 1980s. Design studios and strategic architecture panels such as "Twelve Golden Pens" were established to carry out the renewal process in a design-focused manner (Bishop & Williams, 2020).

For many years, Paris has used architecture and urban design as tools to define the city's identity and promote it internationally. This approach has been particularly embodied in the large-scale architectural projects implemented since the 1970s. Design-driven transformation has not been limited to individual projects but has also been supported by institutional structures. In this context, institutions such as the Pavillon de l'Arsenal have played important roles in researching, exhibiting, and sharing urban design with the public. Today, Dominique Alba, in collaboration with the municipality, continues this tradition by ensuring the continuity of design-focused policies. The Parisian example demonstrates that architecture and urban design can transform not only the physical environment but also the cultural, social, and economic fabric of a city. This approach demonstrates that design is not a luxury but a fundamental component of urban development (Bishop & Williams, 2020).

Copenhagen's urban renewal process, spearheaded by architect Jan Gehl, was a reaction against the car-centric approach of modernist urban planning. Gehl's work, "Life Between Buildings: Using Public Space", formed the theoretical basis for this transformation, emphasizing the impact of public spaces on social interaction and human behavior. Under Gehl's influence, Copenhagen transformed from a car-centric city to a pedestrian- and bicycle-friendly one. This transformation involved enhancing the quality of public spaces, strengthening pedestrian paths and bicycle infrastructure, and encouraging people to spend more time in these areas (Bishop & Williams, 2020).

London's experience with design agencies in urban policy and practice provides an exemplary platform for exploring the potential of these agencies in urban interventions. In 1997, architecture and urban design were reconsidered as part of the "Cool Britannia" vision. The Urban Task Force, chaired by Richard Rogers, adopted principles such as a compact city, the reuse of brownfield sites, pedestrian and bicycle-oriented transportation as part of its vision for a

sustainable, human-scale, and public-space-focused city. To implement these principles in urban space, the Architecture and Urbanism Unit (A+UU) was established as a design agency within the Greater London Authority (GLA) in 2000. Despite lacking a formal mandate, its flexibility and strategic thinking have led to significant projects. This potential led to A+UU's transformation into Design for London (DfL) in 2006. DfL with its stronger structure thanks to effective communication with other departments, has produced designs with a broader impact than A+UU in terms of political influence, implementation skills, and public engagement. DfL aimed to create major transformations through small-scale interventions by prioritizing inter-institutional collaboration, data-driven decision-making, and politically conscious action, while seeking to understand the local context and enhance the existing urban fabric without altering it. In this context, Design for London has implemented strategies such as catching and steering opportunities, implementing big ideas through small, actionable projects, conducting detailed mapping and analysis to understand the city, ensuring continuity through trust-based interagency relationships and generating political influence through informal means (Bishop & Williams, 2020). Edi Rama, the former mayor and later prime minister of Tirana in Albania, viewed architecture and urban design as a transformative tool in urban governance influenced by Design for London. A new design agency, "Atelier Albania," was established in 2014. This agency was structured within the National Planning Office which is affiliated with the Albanian Ministry of Urban Development. Atelier Albania was defined as a tool and environment for integrating design-based methods into national urban policy and development processes. Atelier Albania undertook roles such as developing spatial strategies at the national level, providing consultancy to regional urban teams and mayors, and creating a "space to think" for design thinking. Therefore, it functioned not as a technical planning unit, but as a strategic design platform that fostered creative thinking (Bishop & Williams, 2020).

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Outside of Europe, similar design agency structures have also utilized architecture and urban design as spatial policy tools in New South Wales (NSW), Bogota, and Seoul. The Government Architect for New South Wales (GANSW), operating in the Australian state of New South Wales, constitutes a significant example of designed urban regeneration. GANSW is positioned as a formal and strategic agency directly within the government structure. In this respect, it distinguishes itself from more flexible and semi-independent agencies such as Design for London (DfL). GANSW is particularly well-known for its success in enhancing design quality in the Sydney metropolitan area and is generally regarded as a respected institution within the government. This respect facilitates the consideration of the agency's recommendations by policymakers and practitioners (Bishop & Williams, 2020).

Bogotá, under the leadership of reformist mayor Enrique Peñalosa, demonstrated strong political will and became a prominent example of an “urban renaissance.” Bogotá's transformation was shaped by the goal of reducing social and spatial inequalities in response to widespread displacement, infrastructural depletion and segregated urban areas. At the core of this transformation lies the idea of reconstructing public life through political will and architecture (Castro & Echeverri, 2011).

Country/City	Institutional Structure	Political Status and Institutional Affiliation	Properties and Effects of the Model
United Kingdom/ London	Design for London	Strategic design office within the municipality, directly reporting to the mayor	Integration of policy and design; “opportunity-based” urban transformation; international reference model
Spain/Barcelona	Twelve Golden Pens	Autonomous architectural planning unit within the local government	Public space, human scale, “urban acupuncture” approach; post-Olympic transformation example
France/Paris	Ville de Paris – Atelier Parisien d’Urbanisme	Coordination between the municipal planning agency and the mayor’s office	A model that continues the “Grands Projects” tradition and manages aesthetics and public quality
Denmark/ Copenhagen	City Architect / Jan Gehl Architects effect	Semi-independent expert team advising the municipality	Pedestrian and bicycle-oriented planning model with the principle of “Life Between Buildings”
Australia/Sydney	Government Architect of New South Wales (GANSW)	Official state architectural institution at the state level	A consultancy-focused structure that oversees public policy and design quality
Albania/Tiran	Atelier Albania	Design laboratory within the central government, under the Prime Ministry	Policy-focused national design agency inspired by the DfL model
Colombia/Bogota	Urbanismo Cívico	Social urbanism program run by the municipality	Participatory planning, public space and transport integration
South Korea/Seoul	City Architect Office	Semi-autonomous architectural unit under the mayor	A new city identity vision based on the principle of “Ordinariness”

Table 3. Examples Of Structures Like Design Agencies from Different Cities (Reproduced by Authors from Bishop & Williams, 2020).

Peñalosa went beyond traditional planning approaches, making urban mobility more sustainable through the expansion of a network of bicycle paths and public parks, promoting social equity and transforming the city's physical and social fabric. During this period, architects re-engaged in urban production, taking on an ethical responsibility and utilizing it as a tool for social dialogue in the public interest. Under Peñalosa's leadership, urban renewal evolved into an integrated vision encompassing participatory planning, architectural quality, transportation, and ecological policies. These policies not only improved physical infrastructure but also enhanced the quality of urban life and social participation. Peñalosa's approach demonstrated that urban design could be integrated with social justice and public interest. While Bogotá lacked an institutional design agency

under Peñalosa's leadership, the mayor's office functioned as a de facto design agency. This demonstrates that strong political will can have an impact beyond institutional structures (Castro & Echeverri, 2011).

Seoul undertook large-scale architectural projects during its rapid urbanization process in the late 20th century, however, these projects were primarily driven by engineering and lacked effective design coordination. This led to the weakening of the city's architectural identity and a fragmented urban development model. In 2014, the position of city architect was established within the municipality to rebuild the city's architectural identity, drawing inspiration from urban architecture models in Europe. The fundamental principles of this new structure include grounding urban strategies in local culture and morphology, prioritizing narrative over visual imagery and celebrating "ordinariness." These principles align with the "everyday urbanism" and "local context-oriented planning" approaches that have developed in the West over the past 30 years. Thus, improving the quality of public projects is crucial for redefining urban identity and transforming design from a technical process into a cultural and social tool (Bishop & Williams, 2020).

Examples of design agencies and similar structures seen in cities around the world demonstrate the potential for design thinking as a political tool and prove that urban design can be effective not only in aesthetics but also in areas such as social justice, environmental sustainability and economic inclusion. They also demonstrate that these structures can provide intellectual leadership and strategic direction in urban management. In this context, these examples introduce that design is a political act that local context and user perspective are the foundation of effective design and significant transformations can be achieved through small interventions. In this process, inter-institutional collaboration is key to transformation and design teams are essential to it.

DISCUSSION

This study demonstrates that the roles of architecture and urban design in neoliberal urbanization processes are not limited to technical and aesthetic dimensions; they can also serve as political tools. Ungers's typo-morphological and formal autonomy-focused approaches at the urban design scale and Aureli's theory of "absolute architecture" which contradicts the neoliberal dynamics of urbanization clearly indicate that formal design decisions cannot be independent of social, economic, and political relations. Ungers's urban theories enriched by the concepts of grossform, green archipelago, dialectical object, and dialectical city address the rational shaping of space as a political strategy while Aureli emphasizes the potential of this formalism to generate anti-systemic resistance. Consequently, these two approaches demonstrate that architectural form can simultaneously be both order-building and critical.

Within this theoretical framework, design agencies are contemporary actors who translate both Ungers's formal systems strategy and Auréli's antagonistic conception of autonomy into concrete institutional structures. Examples from cities such as London, Paris, Barcelona, Copenhagen, Sydney, Tirana, Bogotá, and Seoul demonstrate that design agencies can generate political consciousness and social responsibility through the production of spatial form. These institutions function as mediating devices that renegotiate power relations between the state, the market, and the citizens. However, the impact of agencies varies depending on their political context. For example, Design for London and Atelier Albania establish a strategic sphere of influence based on flexible, innovative and intellectual leadership, while Government Architect

NSW or Seoul Metropolitan Architect operate as a more hierarchical, intra-governmental body. Bogota, on the other hand, has demonstrated how architecture can be used as a medium for the reconstruction of public life by the political will of a president. This diversity indicates that the capacity of design agencies to generate direct political action depends not only on their institutional status but also on the cities' democratic culture, planning traditions, and the relationship between architecture and the public.

The dialectic between Ungers's "rational organization of urban form" and Aureli's "resistance of form" transforms design agencies not only into tools of governance but also into "formal laboratories for generating political consciousness." In this context, architecture and urban design cease to be passive instruments of governance processes and become re-politicized based on the principles of spatial justice, solidarity, and ethical responsibility. This analysis fills two important gaps in the literature:

- Explains how design agencies operate not only as tools of "institutional innovation" but also as tools of political form production.
- Reinterprets the political theory of architecture on an institutional scale by relating the theoretical frameworks of Ungers and Aureli to contemporary forms of governance.

CONCLUSION

This study has demonstrated that structures such as design agencies are transformative actors in the contemporary city, both formally and politically. The repositioning of architecture and urban design within governance structures can be interpreted as a contemporary counterpart to Ungers's concepts of "formal autonomy" and Aureli's "absolute architecture." In this context, design agencies possess the capacity to "produce political form" as an alternative to the technical logic of neoliberal planning systems. The study's findings demonstrate that design agencies are not only tools for improving the quality of public space but also platforms for generating political critique and democratic debate. By redefining the spatial relationships between the state, the market and communities these structures revive the social responsibility of architecture. Thus, design agencies are contemporary actors who remind us that urban space is not only an aesthetic but also an ethical and political product. In terms of contribution to the literature, the study presents three important innovations:

- Offers an interdisciplinary synthesis by interpreting Ungers and Aureli's architectural theories through institutional design practices and governance networks,
- Brings a new political approach to urban design literature by conceptualizing design agencies not only as administrative organizations but also as formal and political production areas,
- By comparatively evaluating examples from different countries, the positive impact of design agencies on democratization, social participation and spatial justice processes was suggested as an innovation, especially for administrations where policy and practice are structured in departmental silos.

Consequently, design agencies constitute the spatial and institutional basis for the re-politicization of architecture. The tension between Ungers's systematic formalism and Auréli's antagonistic autonomy reveals these institutions' potential to generate both public value and critical resistance. From this perspective, design agencies are contemporary urban actors transforming not only the appearance of cities but also architecture's political consciousness and ethical remit of architecture. Within this perspective, future research could examine the long-term impact of design agencies on democratic

governance and spatial justice through empirical case studies. Comparative analyses across different political systems and cultural contexts would deepen understanding of their adaptability. Additionally, exploring the integration of digital participatory tools within design agencies could reveal new opportunities for enhancing transparency and inclusivity in urban governance. These findings also have significant implications for design thinking in urban governance. By demonstrating how design agencies institutionalize collaborative and iterative processes, the study extends design thinking beyond project-level innovation to the scale of policy-making and spatial governance. This integration suggests that design thinking can serve not only as a creative methodology but as a strategic tool for democratizing urban transformation and fostering ethical, inclusive decision-making.

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Industrial Timber Construction Systems in Turkey: A Study on Applicability and Potential

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Abstract

Turkey is located in a highly active seismic zone and has experienced numerous destructive earthquakes throughout its history, most recently the 2023 Kahramanmaraş earthquakes, which caused extensive loss of life and structural damage. This context necessitates the exploration of alternative construction systems that can enhance seismic resilience while meeting contemporary sustainability criteria. Timber, as a lightweight and ductile material with a high strength-to-weight ratio, offers significant advantages for earthquake-resistant construction.

Following its long-standing use in traditional building practices, timber construction has undergone substantial transformation since the Industrial Revolution. The emergence of engineered wood products and industrial timber systems has enabled improved structural performance, material efficiency, and durability, while also supporting environmentally responsible construction. These developments position timber as a viable alternative to conventional building materials in modern construction.

This study evaluates the applicability and potential of industrial timber construction systems in Turkey through an assessment of their structural, environmental, and technological characteristics. In addition, contemporary timber construction techniques are reviewed, and a recent industrial timber housing application in a seismic region of Turkey is examined as a case study. The findings aim to contribute to the ongoing discourse on resilient and sustainable construction practices and to support the wider integration of industrial timber systems into the Turkish building sector.

Keywords: Earthquake-Resistant Structures, Engineered Wood, Industrial Timber Systems, Sustainable Construction, Timber Construction.

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INTRODUCTION

Turkey is located in a highly active seismic zone, where destructive earthquakes have consistently revealed the vulnerabilities of the built environment. The 2023 Kahramanmaraş earthquakes, which resulted in extensive structural damage and significant loss of life, have once again underscored the necessity of re-evaluating construction practices in terms of seismic safety and resilience. In this context, the exploration of alternative building systems that can respond to both structural and environmental challenges has become increasingly critical. Despite its historical presence in traditional architecture, timber has remained largely underrepresented in contemporary construction practice in Turkey. Over the past few decades, the limited inclusion of timber design, construction techniques, and seismic performance in engineering education has led to a decline in technical knowledge and skilled labor. Consequently, both the construction of new timber buildings and the maintenance or rehabilitation of existing ones have been neglected. In addition, challenges related to cost, material supply, technical infrastructure, and project management continue to restrict the development of the timber construction sector.

Nevertheless, timber presents significant advantages as a structural material, particularly in earthquake-prone regions. Its low self-weight, high strength-to-weight ratio, and inherent flexibility contribute positively to seismic performance. Alongside these structural benefits, timber also offers advantages in terms of thermal performance, environmental sustainability, and adaptability to different site conditions. Recent advancements in engineered wood products and treatment technologies have further enhanced the durability, fire resistance, and dimensional stability of timber, enabling its use in more complex and large-scale applications.

In the global context, timber construction has gained renewed momentum, particularly in countries with advanced construction technologies and strong environmental policies. In addition to Japan and Canada, several European countries—including Germany, Austria, Sweden, and Finland—have widely adopted industrial timber systems, supported by research, innovation, and regulatory frameworks. In contrast, the use of such systems in Turkey remains limited, despite the presence of traditional timber structures that have demonstrated considerable resilience over time.

Within this framework, this study focuses on the current position and future potential of industrial timber construction systems in Turkey, considering their structural, technological, and environmental dimensions. Particular emphasis is placed on evaluating their practical implementation through a contemporary housing application in a seismic region.

In order to better understand the potential of industrial timber construction in Turkey, it is first necessary to examine timber as a construction material, its technological development, and engineered wood products used in modern construction.

TIMBER CONSTRUCTION: MATERIAL PROPERTIES AND TECHNOLOGICAL DEVELOPMENT

Timber has been one of the earliest and most widely used building materials throughout human history, initially employed in mass (solid) constructions and later evolving into lighter, more flexible frame (carcass) systems (Herzog et al.,

2004). This evolution reflects not only changes in construction techniques but also the material's shaping, detailing, and functional adaptation over time.

A pivotal point in industrial timber construction was the development of the "Balloon Frame" system in Chicago, USA, in the 1830s. By enabling mass production of standardized small-section timber elements, this technique reduced labor time and costs, facilitating large-scale housing construction and laying the foundation for modern industrial timber systems. Simultaneously, innovations in panel production, such as plywood, allowed small, otherwise unusable wood pieces to be efficiently utilized, further expanding timber's applicability in engineered construction.

The Industrial Revolution accelerated these developments, introducing advanced processing technologies that improved precision, speed, and quality in timber fabrication. Chemical treatments and adhesives enhanced wood's durability, mechanical properties, and resistance to environmental impacts. Over the past fifty years, engineered timber products such as Glued Laminated Timber (Glulam), Cross-Laminated Timber (CLT), and Laminated Veneer Lumber (LVL) have emerged, offering lightweight yet high-performance structural solutions suitable for modern construction.

Technological Solutions to Timber's Weaknesses

Contemporary timber technologies address traditional limitations such as fire susceptibility, biological degradation, moisture-induced deformation, and mechanical constraints. Modern techniques allow timber to resist fire for up to 90–120 minutes through proper sizing, char layer formation, and fire-retardant treatments (Kartal, 2015). Biological degradation is mitigated via moisture control and advanced modification processes like Thermowood, which significantly improve durability without harmful chemicals. The modular structure of timber enables the local repair or replacement of damaged elements, thereby contributing to long-term sustainability and cost-effective maintenance.

Advantages of Timber as a Construction Material

Engineered timber offers significant structural, environmental, and functional benefits. Its lightweight nature reduces dead loads on foundations and structural elements, particularly advantageous in seismic regions (UNECE/FAO, 2020). High strength-to-weight ratios, predictable mechanical behavior, and low thermal conductivity make timber efficient for energy performance and structural reliability (Green et al., 1999). Prefabricated timber systems reduce construction time and cost, while carbon storage potential contributes to sustainability. Timber's acoustic properties, ease of fabrication, and compatibility with modern modular design enhance both occupant comfort and architectural flexibility (Frangi et al., 2009; Rice, 2006).

Industrial Timber Products

Industrial timber is produced by assembling wood components (planks, veneers, strands, or particles) using adhesives or mechanical fasteners under controlled factory conditions, yielding homogeneous, high-performance structural elements (Forest Products Laboratory, 2010). Key products include:

- Cross-Laminated Timber (CLT): High-strength, prefabricated panels with orthogonal layers offering excellent seismic performance and modularity for multi-story buildings (Brandner et al., 2016; Pei et al., 2013).
- Glued Laminated Timber (Glulam): Laminated elements enabling large spans and versatile structural applications, with enhanced strength through parallel or reinforced laminations.

- Laminated Veneer Lumber (LVL): Engineered beams and columns with high dimensional stability, suitable for structural framing and supporting tall or complex structures.
- Nail-Laminated Timber (NLT) and Dowel-Laminated Timber (DLT): Multi-layered panels connected mechanically with nails or wooden dowels, offering modularity and sustainability.
- Thermowood: Heat-treated timber with enhanced durability, dimensional stability, and environmental compatibility.

Industrial timber systems provide advantages in seismic resilience, lightweight construction, sustainability, rapid assembly, and reduced carbon footprint. Countries like Japan, Canada, Germany, Austria, and Sweden have successfully integrated these systems into their construction practices, offering valuable models for seismic regions such as Turkey.

These technological developments and engineered wood products have enabled the emergence of various industrial timber construction systems. Therefore, the following section discusses the classification and structural characteristics of industrial timber construction systems.

INDUSTRIAL TIMBER CONSTRUCTION SYSTEMS

Industrial timber construction systems have gained significant attention in contemporary architecture due to their lightweight, sustainable, and rapid assembly characteristics. These systems integrate traditional timber techniques with modern prefabrication technologies, allowing for efficient and environmentally conscious building solutions.

General Classification of Systems

Timber construction systems can be broadly categorized into three main types based on their structural principles and assembly methods (Ramage et al., 2017; Green, 2012):

1. Mass Timber Systems – Solid or engineered timber elements stacked and interlocked to form load-bearing walls.
2. Timber Panel Systems – Prefabricated panelized elements such as walls, floors, and roofs, often using cross-laminated timber (CLT) or glulam.
3. Timber Frame Systems – A skeletal framework of columns, beams, and braces that carries the structural loads, with non-load-bearing infill walls.

This classification provides a clear framework for understanding the design, construction, and performance characteristics of industrial timber structures.

Industrial Timber Construction Systems Mass timber systems

Mass timber systems consist of horizontally stacked timber elements that are interlocked at corners to create structural walls (Çobanoğlu, 1988). Modern mass timber construction typically combines traditional techniques with factory prefabrication: CNC machining, laser cutting, and pressing technologies allow for highly precise, modular components.

Advantages:

- Structural stability and durability
- Seismic performance due to lightweight and flexible behavior
- Rapid on-site assembly

Mass timber structures are increasingly used in residential and public buildings, reflecting both aesthetic and structural benefits.

Timber panel systems

Panel-based timber systems involve prefabricated wall, floor, and roof panels designed according to structural requirements. Typical panel dimensions range from 5–45 cm in thickness, up to 4 m in height, and approximately 20 m in length. Innovative Materials:

- Cross-Laminated Timber (CLT)
- Glued Laminated Timber (Glulam)
- Structural Composite Elements

Advantages:

- High level of prefabrication and modularity
- Fast assembly and reduced on-site labor
- Improved quality control and energy efficiency (Ramage et al., 2017; Gustafsson et al., 2019)

These systems enable construction of mid-rise and high-rise timber buildings, demonstrating the scalability of industrial timber solutions.

Timber frame systems

Timber frame systems rely on a load-bearing timber skeleton, with walls serving mainly as infill. Columns, beams, and braces transfer loads to the foundation. This approach has a long history in North America and Northern Europe, including variants such as Balloon Frame and Timber Frame. In Turkey, traditional “hımiş” structures represent a local adaptation.

Construction Process:

1. Construct the primary timber frame.
2. Integrate cross braces for lateral stability.
3. Insert insulation materials into the cavities.
4. Apply interior and exterior finishes (timber cladding, OSB, gypsum boards).

Advantages:

- Lightweight and high seismic resilience
- Prefabrication enables rapid and efficient assembly
- Environmentally sustainable with renewable materials
- Design flexibility and modularity

Timber frame construction combines traditional craftsmanship with modern engineering, providing sustainable, adaptable, and safe building solutions.

Prefabrication of timber elements

Prefabrication in controlled factory environments enhances quality, speed, and sustainability:

- Production: CAD/CAM, CNC machining, laser cutting, and automated assembly ensure precise, standardized components (Green, 2012; Dinwoodie, 2000).
- Speed: A 100 m² building can be prefabricated and assembled in 14 days, while in Europe, this duration can be as low as 2 days.
- Durability: Kiln-dried and impregnated timber resists decay, insects, and fire (Ross, 2010).
- Sustainability: Reduced energy use, minimal material waste, recyclability, and low carbon footprint.

Prefabricated timber systems combine quality, speed, and environmental benefits, making them a modern, efficient alternative in industrial construction. Understanding these structural systems is particularly important in seismic regions, where material behavior and structural design directly influence earthquake performance. For this reason, the next section examines the relationship between earthquakes, architecture, and material behavior, with a focus on timber structures.

EARTHQUAKE, ARCHITECTURE AND MATERIAL BEHAVIOR

Earthquake and Architecture

Earthquakes, caused by the continuous movement of tectonic plates, are natural phenomena that occur frequently and can sometimes result in catastrophic destruction. During seismic events, shock waves generate high-amplitude horizontal forces on buildings, whereas most structures are primarily designed to resist vertical loads. This mismatch makes buildings particularly vulnerable to lateral stresses, leading to damages ranging from minor cracks to partial or total collapse.

Scientific research and technological developments in earthquake engineering have therefore focused on improving building safety in tectonically active regions (Mazzolani & Dolce, 2009). Among various parameters affecting seismic performance, material selection plays a decisive role. Lightweight and flexible materials such as timber perform better under seismic loads because they can absorb and dissipate energy more effectively than rigid and heavy materials. In practice, seismic performance is influenced by both engineering-based reinforcement systems and the intrinsic properties of structural materials. For example, pendulum systems, tuned mass dampers, and flexible foundation systems are widely used in tall buildings to reduce structural sway. However, the efficiency of these systems largely depends on the mechanical behavior of the structural material itself. Materials with high ductility, particularly timber, improve energy dissipation capacity and increase overall structural resilience (Ceccotti et al., 2013).

Architectural design decisions are equally critical for earthquake-resistant buildings. Irregular mass distribution, asymmetric geometry, soft stories, or discontinuities in load-bearing elements can negatively affect seismic performance. Therefore, earthquake resistance must be considered from the earliest stages of architectural design, ensuring that structural systems and architectural decisions are developed together. This integrated approach improves safety while maintaining functionality and architectural quality.

Seismic design principles can be broadly categorized into three main groups:

1. General geometric form — the building's three-dimensional form, mass distribution, and orientation, which directly influence seismic behavior;
2. Architectural details prone to failure — such as weak connections, structural discontinuities, and plan irregularities;
3. Non-structural elements — including partition walls, ceilings, façade elements, and mechanical installations that may pose risks during earthquakes if inadequately designed (Alecci et al., 2019).

Finally, seismic behavior cannot be evaluated independently from soil conditions. Soil type significantly affects the propagation of seismic waves. Soft soils may amplify ground motion and increase structural stresses. When the natural period of the ground matches that of the building, resonance can occur, especially in mid- and high-rise structures. Also, soil liquefaction in water-saturated sandy soils may cause settlement, tilting, or collapse, regardless of the structural system. For

this reason, modern building codes such as TBDY 2018 require site-specific seismic design that considers soil–structure interaction. In weak or heterogeneous soil conditions, advanced engineering solutions such as seismic isolation systems or deep foundation systems may be required to ensure structural safety.

Wooden Construction and Earthquake

The earthquake resilience of buildings depends not only on engineered reinforcement systems but also on the inherent properties of construction materials. Timber, in particular, performs well under seismic loads due to its ductility and its ability to absorb and dissipate seismic energy. Its fibrous cellular structure allows significant deformation before failure, enabling timber structures to resist lateral forces more effectively than brittle materials such as masonry or poorly detailed concrete (Smith et al., 2003).

Another important advantage of timber is its low weight. Since seismic forces are directly proportional to the mass of the structure, lighter buildings are subjected to lower inertial forces during earthquakes. This significantly reduces the seismic loads acting on the structure. However, optimal seismic performance requires a balance between stiffness and flexibility. Overly rigid systems may fail suddenly and brittly, whereas overly flexible systems may lead to excessive displacement and user discomfort. Experimental studies show that massive timber buildings, especially when combined with steel connectors or hybrid structural systems, perform very well under both vertical and horizontal loads due to their high energy dissipation capacity.

From an architectural perspective, earthquake-resistant buildings must not only ensure structural safety but also address post-disaster needs such as emergency shelter, rapid construction, logistics, and community recovery. Timber construction, particularly industrially produced massive timber systems, meets these requirements through high seismic performance, fire resistance, low carbon footprint, and recyclability.

Industrial timber construction systems are typically prefabricated in factory conditions, which ensures high precision in joints and connections. Openings for mechanical and electrical installations can be pre-planned and integrated into panels, which significantly accelerates on-site assembly and reduces construction errors and labor requirements. This system also allows flexible interior layouts and supports architectural variation through different material combinations and façade systems.

Furthermore, the natural properties and environmental benefits of timber help reduce the environmental and psychological impacts in earthquake-affected regions. For these reasons, timber construction can be considered a safe, sustainable, and rapidly deployable building solution for post-earthquake housing production.

Seismic Resistance of Timber Structures: Historical and Experimental Insights

Historical and contemporary earthquake records indicate that timber structures often perform better than masonry buildings and poorly detailed reinforced concrete structures. After major earthquakes such as the 1509 Istanbul earthquake and the 1755 Lisbon earthquake, timber-based structural systems were developed as earthquake-resistant construction techniques. Examples include the Turkish himiş system, the Portuguese gaiola pombalina, the Italian casa baraccata, and the Latin American quinchá and bahareque systems. These systems were designed as lightweight, flexible, and energy-dissipating structural solutions.



Figure 1. Earthquake shake table tests of a cross-laminated timber (CLT) earthquake-resistant building (UL Solutions, 2023).

Observations from more recent earthquakes, including the 1894 Istanbul, 1994 Northridge, 1995 Kobe, 1999 Kocaeli, and 2023 Kahramanmaraş earthquakes, further demonstrate that well-designed and properly maintained timber structures generally suffer less damage compared to heavy masonry buildings. However, poor workmanship, material decay, insufficient bracing, or inadequate connections can significantly reduce seismic performance.

Recent experimental studies have confirmed these observations, particularly with modern engineered wood products such as Cross-Laminated Timber (CLT), Laminated Veneer Lumber (LVL), and Glulam (GLT). Large-scale shake table tests conducted in the United States, Europe, and Turkey have shown that massive timber buildings with advanced connection systems, self-centering shear walls, and hybrid structural solutions can withstand strong seismic forces with minimal structural damage while maintaining post-earthquake functionality (Ceccotti et al., 2013).

Overall, both historical evidence and experimental research demonstrate that the seismic performance of timber structures depends on structural design, connection detailing, material durability, and proper maintenance. By combining traditional construction knowledge with modern engineering technologies, timber emerges as a resilient, sustainable, and strategic material for earthquake-resistant architecture.

Considering the seismic performance, sustainability, and construction efficiency of timber structures, it is important to evaluate their applicability in earthquake-prone countries. Therefore, the following section discusses the applicability and development potential of industrial timber construction systems in Turkey.

APPLICABILITY OF INDUSTRIAL TIMBER SYSTEMS IN TURKEY

Current Situation of Timber Construction in Turkey

The development of the construction sector in Turkey has been largely based on reinforced concrete structures. Today, almost the entire building production system, including education, design software, regulations, and construction industry infrastructure, is organized around reinforced concrete construction. As

a result, timber construction represents a very small portion of the building stock in Turkey (Figure 1, Table 1).

According to statistical data, timber structures account for less than 1% of total construction production in Turkey. Between 2002 and 2018, only 13,988 timber houses were built out of a total of 1,497,420 housing units, corresponding to approximately 0.93% of all residential construction. This data clearly indicates that timber construction has a very limited role in the Turkish construction sector.

Total Number of Timber Houses	Total Number of Houses	Percentage (%)
13,988	1,497,420	0.93

Table 1. Proportion of timber buildings based on building permit data (2002–2018). Turkish Statistical Institute (TÜİK).

The distribution of timber construction companies across the country also reflects this limitation. Most timber construction companies are located in the Marmara region, while only a few companies operate in the Aegean, Central Anatolia, Black Sea, and Mediterranean regions, and almost none in Eastern and Southeastern Anatolia. This uneven distribution demonstrates that the industrial timber construction sector in Turkey is regionally limited and underdeveloped (Figure 2).

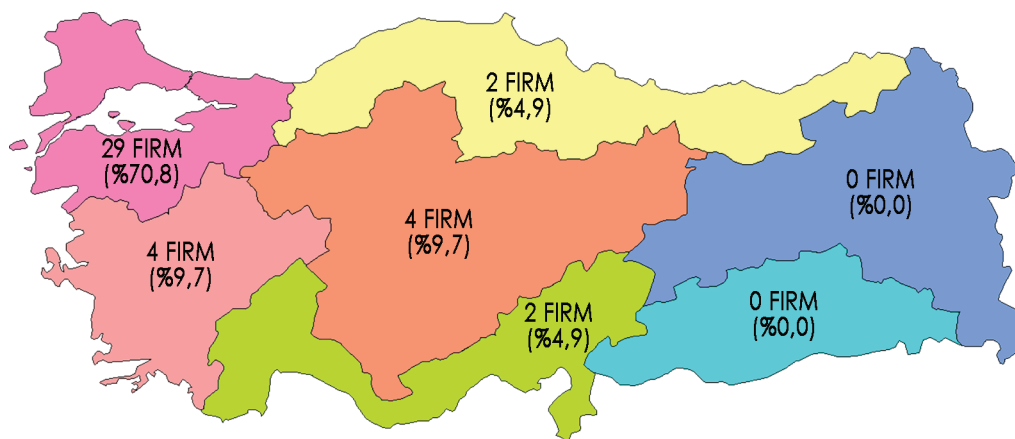


Figure 2. Distribution of timber construction companies by geographical regions (Kurul, 2019).

Earthquake Risk and the Need for Alternative Structural Systems

Turkey is located in one of the most active seismic regions in the world and has experienced numerous destructive earthquakes throughout its history. Since the 16th century, more than twenty earthquakes with magnitudes greater than 7 have occurred in different regions of the country. Major earthquakes such as Erzincan, Elazığ, Van, İzmir, Gölcük, Düzce, and most recently the 2023 Kahramanmaraş earthquakes caused significant loss of life and property.

The 2023 Kahramanmaraş earthquakes resulted in tens of thousands of casualties and the collapse or severe damage of hundreds of thousands of buildings. These events once again demonstrated the vulnerability of the existing building stock and the urgent need for safer, more resilient construction systems.

When earthquake experiences from other seismic countries such as Japan, Canada, and the United States are examined, it can be observed that timber structures generally perform better during earthquakes and result in fewer casualties compared to heavy masonry or poorly constructed reinforced concrete buildings. This situation indicates that timber construction systems could be an important alternative structural solution for earthquake-prone regions such as Turkey.

In contrast, earthquake experiences in other seismic countries demonstrate the advantages of timber construction. Research conducted by the Institute for Research in Construction in Canada shows that even in strong earthquakes, timber buildings rarely collapse compared to masonry or poorly detailed reinforced concrete buildings (Institute for Research in Construction, Canada, 2023). Furthermore, data compiled by Karacabeyli (2023) indicates that fatalities directly caused by the collapse of timber frame buildings are extremely rare and in many cases recorded as zero. This highlights the importance of timber structures in terms of life safety, which is the primary goal of earthquake-resistant design. The life-safety performance of timber frame buildings observed in past earthquakes is summarized in Table 2.

Table 2. Seismic performance of timber frame buildings in terms of life safety (Karacabeyli, 2023).

Earthquake	Magnitude (Richter)	Total Deaths	Deaths in Timber Frame Buildings	Timber Frame Buildings Exposed to Severe Shaking
Alaska, 1964	8.4	130	<10	–
San Fernando, CA, 1971	6.7	63	4	100 000
Edgecumbe, NZ, 1987	6.3	0	0	7 000
Saguenay, QC, 1988	5.3	0	0	10 000
Loma Prieta, CA, 1989	5.7	66	0	50 000
Northridge, CA, 1994	7.1	60	20	200 000
Hyogo-ken Nanbu, Kobe, Japan, 1995	6.7	6 300	0	8 000

Barriers to the Development of Timber Construction in Turkey

Despite its advantages, timber construction has not developed sufficiently in Turkey due to several structural, economic, technical, and educational factors. One of the main reasons is the industrial structure of the construction sector. In Turkey, the cement, steel, and ready-mixed concrete industries are highly developed and constitute a significant part of the construction economy. Engineering education, vocational training, and structural design software are also predominantly based on reinforced concrete systems. As a result, both engineers and contractors are more familiar with concrete construction systems, which reinforces their preference in design and implementation practices and further limits the consideration of alternative structural systems. Another important limitation is the lack of industrial production infrastructure for engineered wood products such as CLT, LVL, and Glulam. These materials are widely produced and used in Europe and North America, but in Turkey production capacity is still limited and most high-performance engineered wood products are imported, which increases construction costs.

In addition, the number of skilled workers and craftsmen experienced in timber construction has significantly decreased over time. Traditional timber construction knowledge has not been sufficiently transferred to modern construction practices, and timber construction has been largely neglected in engineering and architecture education for many years.

Forestry policies and raw material production also affect the development of timber construction. Although Turkey has significant forest resources, the production of structural timber suitable for engineered wood products is limited. Suitable species for structural timber production are not systematically cultivated, and high-quality structural timber is often imported. Furthermore, long-term forest management and sustainable timber production policies are not sufficiently integrated with the construction sector.

Economic factors also play an important role. Timber construction is often perceived as more expensive than reinforced concrete construction in Turkey. The dependence on imported engineered wood products, limited number of contractors, and lack of industrial-scale production increase costs and reduce competitiveness.

The development of timber construction in Turkey is closely related to building regulations, seismic codes, and technical design standards. Due to the country's high seismic risk, earthquake regulations in Turkey have a long history and have been continuously updated after major earthquakes based on engineering experience and scientific research. Over time, Turkish seismic regulations have evolved from prescriptive rules to more advanced performance-based design approaches.

The current Turkish Building Earthquake Code (TBDY 2018) includes modern seismic design principles such as performance-based design, site-specific seismic hazard assessment, and advanced structural analysis methods. With its comprehensive content and analytical approaches, TBDY 2018 is considered one of the modern seismic design codes internationally. This regulation provides a strong framework for earthquake-resistant structural design, including timber structures.

However, specific regulations and design guidelines for modern industrial timber structures have only recently begun to develop in Turkey. For many years, existing standards were mainly focused on traditional timber construction systems, and there was a lack of detailed technical guidance for modern engineered timber systems such as CLT, Glulam, and LVL. This lack of comprehensive regulations and design guides for multi-story timber buildings has slowed the development of industrial timber construction systems in Turkey.

An important milestone in this field is the publication of the Timber Structures Regulation in 2025. This regulation represents the first comprehensive national guideline specifically addressing the design, calculation, detailing, and construction principles of modern timber structures in Turkey. The regulation provides engineers and architects with a clearer legal and technical framework and reduces uncertainties in design approval and construction processes. Therefore, this development is expected to encourage the wider use of timber construction systems in the coming years.

Despite these regulatory developments, the practical implementation of industrial timber construction still requires improvements in industrial production capacity, education, technical expertise, and supply chains. In this context, recently constructed industrial timber housing projects in Turkey provide valuable case studies for evaluating the practical application of these regulations and construction systems under real conditions.

Opportunities for Industrial Timber Construction in Turkey

Despite these limitations, Turkey has significant potential for the development of industrial timber construction. The country has a large housing demand, high seismic risk, and increasing interest in sustainable construction materials. Industrial timber construction systems offer several advantages for Turkey, including:

- Lightweight structures with better seismic performance
- Prefabrication and rapid construction
- Reduced construction waste
- Lower carbon emissions

- Sustainable and renewable building material
- Suitable for post-disaster housing production
- Flexible architectural design possibilities

In recent years, especially after the 2023 earthquakes, interest in timber construction has increased again, and several pilot projects and government-supported initiatives have been initiated. However, for industrial timber construction to become widespread in Turkey, improvements are needed in industrial production, education, regulations, forestry policies, and public awareness.

In conclusion, although timber construction currently represents a very small portion of the construction sector in Turkey, the country's high seismic risk, growing housing demand, and sustainability goals create significant potential for the development of industrial timber construction systems. However, industrial production capacity, education, regulations, and economic conditions must be improved in order for these systems to become a viable alternative to reinforced concrete construction in Turkey. The Osmaniye Industrial Timber Housing Project, discussed in the following section, provides an important case study for evaluating the practical applicability of these systems under real construction conditions.

In order to better understand the practical implementation of these systems in Turkey, the following section presents the Osmaniye Industrial Timber Housing Project as a case study.

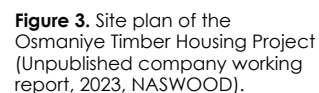
CASE STUDY: OSMANIYE TIMBER HOUSING PROJECT **Project Background and General Description**

The Osmaniye Industrial Timber Housing Project was previously examined in a study focusing on earthquake-resistant timber housing design in Turkey (Plekhanova & Erdoğan, 2025). In the present study, the project is re-evaluated within a broader framework to discuss the applicability and development potential of industrial timber construction systems in Turkey.

Following initiatives such as the 2022 "Timber Use Promotion Workshop" held in Ankara, Turkey initiated one of its first collective industrial timber housing projects in Osmaniye, a region located in a high seismic zone. The project was commissioned by the General Directorate of Forestry (OGM), designed by NMK Architecture, and constructed by NASWOOD. The project was intended to serve as a pilot application for the development of timber construction regulations and the wider adoption of industrial timber construction systems in Turkey (Figure 3).

The development consists of three residential blocks with three floors and a basement, forming a residential complex with 36 apartments (3+1 units). The site also includes shared facilities such as parking areas, sports areas, playgrounds, and green spaces. Each residential block has a footprint of approximately 740 m², and the total construction area of the site is approximately 2200 m².

Due to seismic safety requirements and functional needs, a hybrid structural system was adopted in the project. Reinforced concrete was used in the basement floors, building cores, and some shared spaces, while the residential upper floors were constructed using industrial timber structural systems. This hybrid approach combines the rigidity of reinforced concrete with the lightness and flexibility of timber structures, improving overall seismic performance.



Use of Engineered Timber in the Osmaniye Housing Project

Exterior façades were covered with timber cladding to emphasize natural aesthetics, while OSB panels were used in wall systems to improve thermal insulation and structural performance. Interior spaces such as corridors included timber panel applications, and MDF furniture and laminated wood surfaces were used in apartments to create a warm and natural interior atmosphere. This integrated material approach combines structural performance, environmental benefits, and architectural aesthetics, positioning timber as a key material for modern housing design.

For the main load-bearing structural system, glulam spruce timber was used in large cross-sections for columns and beams. The timber elements were kiln-dried to a moisture content of approximately 10–12% to ensure bonding quality and prevent cracking. The elements were then planed, calibrated, defect-checked, and classified before lamination. Long structural members, up to 8.87 meters in length, were produced using finger-jointing techniques. MUF adhesives were applied, and elements were cold-pressed to produce high-strength glulam structural components.

CNC machining technology was used for precise cutting, drilling, and detailing of structural connections (Figure 3, Figure 4). This significantly improved assembly speed, structural accuracy, and seismic performance. Accurate connection detailing ensured structural rigidity while allowing controlled energy dissipation under dynamic loads such as earthquakes. Finished structural elements were tested, labeled for traceability, protected against moisture and damage, and delivered to the construction site in assembly order (columns, beams, floors, walls, roof elements).



Figure 4. Wall frame of the Osmaniye Timber Housing Project (Unpublished company working report, 2023, NASWOOD).

This production process demonstrates a high level of engineering precision, quality control, and sustainability, enhancing not only structural performance but also construction efficiency and seismic resilience. Overall, the project represents one of the first modern applications of glulam structural systems in multi-story residential construction in Turkey.

Assembly Process of the Osmaniye OGM Timber Housing Project

The Osmaniye OGM timber housing project demonstrates how prefabricated industrial timber systems can significantly shorten construction time, reduce labor requirements, and improve construction quality. Structural elements were produced in a factory environment using CNC technology, classified according to assembly sequence, and transported to the construction site. This process minimized on-site labor, reduced construction errors, and improved overall construction efficiency.

Construction began with reinforced concrete raft foundations. Although timber structures are relatively lightweight, raft foundations were preferred due to seismic safety requirements, soil conditions, and the presence of basement floors. While foundation construction was ongoing on site, timber structural elements were simultaneously engineered, digitally processed, and manufactured in the NASWOOD production facilities, demonstrating the advantages of parallel construction processes in prefabricated building systems.

On-site assembly followed a systematic sequence. Timber columns were first anchored to the foundation, followed by the installation of beams forming the main structural frame. After the structural frame was completed, prefabricated floor elements, partition walls, and roof structures were installed. Finally, façade cladding, windows, mechanical systems, and interior finishes were completed. The project applied a hybrid structural system combining reinforced concrete structural elements with a timber superstructure. This hybrid system provided structural rigidity in the lower levels while maintaining the lightweight and sustainable characteristics of timber in the upper floors. Prefabrication and CNC production significantly improved construction speed, precision, and seismic safety, making this project an important example of modern hybrid timber construction in Turkey.



Figure 5. Column anchorage connection of the Osmaniye Timber Housing Project (Unpublished company working report, 2023, NASWOOD).

Seismic Design Principles of the Osmaniye Timber Housing Project

The hybrid timber–concrete structural system was specifically designed to improve earthquake performance. The low weight and elastic behavior of timber reduce lateral seismic forces and allows controlled deformation under seismic loads. Structural stability was improved through symmetrical placement of columns, orthogonal load-bearing systems, and balanced façade openings. Connections were designed as energy-dissipating elements using CNC-machined timber joints combined with steel plates and bolted connections (Figure 5). Approximately 850 m³ of timber was used in the superstructure, and the structural system was designed to provide flexibility rather than excessive rigidity, ensuring safer structural behavior during earthquakes.

From an architectural perspective, the project also addresses post-disaster housing needs by allowing rapid assembly and flexible interior layouts. Prefabrication enables different combinations of timber structural elements and building configurations, allowing adaptable housing solutions. In addition, the natural appearance, warm material character, and environmental benefits of timber help reduce the environmental and psychological impacts in earthquake-affected regions, improving occupant comfort and well-being.

Overall, the Osmaniye Timber Housing Project demonstrates that industrial timber construction systems can be successfully applied in seismic regions of Turkey and can provide a viable alternative to conventional reinforced concrete construction in terms of seismic performance, sustainability, and construction efficiency.

CONCLUSION

Turkey's seismic history and the devastating consequences of the 2023 Kahramanmaraş earthquake highlight the urgent necessity of rethinking material choices and construction practices. This study has demonstrated that industrial timber construction systems, when integrated with modern engineering and architectural strategies, offer significant advantages in terms of seismic resilience, sustainability, and housing quality. With its lightweight, ductile, and energy-absorbing characteristics, timber reduces earthquake-induced forces, while prefabricated production technologies improve construction precision, speed, and quality control.

The OGM Osmaniye Timber Housing Project stands out as one of the first hybrid systems (reinforced concrete–industrial timber) implemented in Turkey. Being realized in a high seismic risk zone, the project demonstrates that timber structures can be a strong alternative for earthquake-resistant construction. The buildings, constructed using approximately 850 m³ of timber, achieved structural precision and reliable seismic performance through CNC-fabricated joints and steel connection details that ensured durability and structural integrity. Environmentally, the project contributed to sustainability by storing approximately 701 tons of CO₂, significantly reducing its carbon footprint. Beyond structural safety, the design emphasized the natural texture and warm atmosphere of timber, combined with passive climate control strategies, to create a comfortable, aesthetic, and user-centered living environment. As a pioneering example, the project provides both a technical reference and a practical model for future timber housing initiatives in seismic regions.

Ultimately, the integration of industrial timber construction into Turkey's housing sector represents not only a structural and technological innovation but also a cultural and environmental transformation toward more resilient, ecological, and human-centered construction. However, for industrial timber construction systems to become widespread in Turkey, improvements are needed in industrial production capacity, forestry policy, education, technical expertise, and regulatory frameworks. Continued research, policy support, and professional training will be essential to expand their application and unlock timber's full potential in shaping earthquake-resistant and sustainable urban development in Turkey.

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