INTERNATIONAL JOURNAL OF CONSERVATION SCIENCE
ISSN: 2067-533X Volume 15, Issue 4, 2024: 1653-1672 www.ijcs.ro
DOI: 10.36868/IJCS.2024.04.04

RE-FUNCTIONING OF HISTORIC BUILDINGS: THE CASE OF SANTRALISTANBUL

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Abstract

Historical buildings should be evaluated for a different function than its original function, or it should be included in life with its original function. Within the scope of this study, the Santralistanbul project, which was designed with the transformation of Silahtarağa Power Plant, which sets an example for industrial structures that have been adaptive reused as a science, culture and art structure in Turkey, is examined. The Silahtarağa Power Plant, chosen as the sample area, has an important historical period in terms of being the first urban scale, coal-fired thermal power plant of the Ottoman Empire. Although its structural setup in the past was built on electricity generation, the idea of living urban spaces is maintained through the new functions given to historical buildings, taking into account the user-oriented arrangements and architectural approaches it offers. As a result of the literature review and field study, the data was obtained and the guiding qualities in the relationship between physical architecture and thematic formations were interpreted. The infrastructure that will provide a different perspective on architectural space readings, adaptive reusing and protection of historical buildings, determining intervention decisions and enabling the acquisition of necessary information for new sustainable designs has been constructed.

Keywords*: Historical Buildings; Industrial Buildings; Refunction; Conservation; Santralistanbul*

Introduction

Changes/transformations related to human and social structure also affect the physical architectural spaces where life takes place. In today's conditions, meeting the spatial requirements with different functional characteristics turns the direction of new designs into idle industrial structures, which are considered important in terms of historical continuity. Although these structures have lost their functions, they are seen among the most valuable parts/representations/symbols of historical, industrial and cultural stability [1]. In this context, the architectural structure, space organization, usage, socio-cultural opportunities and the vital bridge construction between the past and the future of the industrial apartment, which has gained a new face with re-functioning, come to the fore. The concept of re-functioning, which provides the protection of historical preservation, includes options where the values of the city continue, knowing the criteria of today's life, contributing towards what is directed, and offering alternative sub-spaces [2].

Within the scope of urban change/transformation, the re-functioning of industrial buildings for different purposes, additions are made to the design fiction for environmental,

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social, economic, cultural, political, technological reasons and for the purpose of protection and survival [3]. While the transformation of industrial buildings, which have lost their original function, into living focal spaces is achieved by re-functioning, cultural and urban memory is kept alive by increasing their usage features [4; 5]. The concept of refunctioning is seen beyond the architectural renewal approach made specifically for historical buildings. While the preservation of these structures, which bear the traces of urban culture and experience, is ensured by the right design decisions, thematic and physical interventions, the living standard of the users changes. In this direction, the buildings, which are integrated into urban life with their new function and structural stance, become important, inseparable and indispensable parts of the urban fabric with their historical process, architectural and aesthetic details [6].

It seems possible for structures that have undergone physical changes over time to preserve/maintain their existence, and to age healthy, by fulfilling their spatial functions. While the vital process, which is completed with new function/s loaded on buildings other than the first function, is continued with new areas of use, structures with historical value and cultural accumulation are evaluated and transferred to future generations [7]. Thus, taking into account the original and initial state of the buildings, re-functioning in line with current needs and participating in the usage process extends their lives and provides continuity in socio-cultural and economic terms [8]. The new function loading proposed to increase the structural life of historical buildings, to bring them into society and to provide environmental benefits develops within the spatial order [9]. The transformation of Silahtarağa Power Plant, which has historical value and is within the scope of industrial heritage, into Santralistanbul with its new functions, and its qualified and quality interventions are a good example that takes place in the relationship of thematic and physical formation.

Re-functioning and Architectural Design

While seeking answers to current needs and changes with re-functioning, it is seen as an architectural design problem to bring ruined buildings to a livable state by getting rid of demolition [10]. Refunctioning; it is the improvement of a structure that exists in terms of international criteria but has lost its function, by adapting it to the urban texture in which it is located in socio-economic and cultural terms in order to protect it and to contribute to production by combining it with today's contemporary living conditions [11].

There are two different views on the architectural dimension of refunction or reuse. First sight; accepts refunctioning as one of the restoration techniques. According to this view, restoration, which means preserving the historical document and aesthetic value by intervening the historical building as little as possible, has six different techniques. These; consolidation, reintegration, renovation and rehabilitation, reconstruction, cleaning and transportation [12; 13]. The second view argues that refunctioning is different from all other restoration methods. Because giving a new function to a building means putting it into a natural architectural design process [14]. Accordingly, refunctioning is not about providing protection by making some usage change. It is all the physiological changes that are necessary for the structure to fully meet its new function. In this context, refunctioning; it is an architectural method in itself, that is, an alternative building production technique [15]. Although the re-functioning of buildings is a current issue in our country and in the world, various studies are carried out to define the subject and to establish a systematic infrastructure. These studies are generally summarized as the factors affecting the selection of appropriate functions in buildings and the interventions that can be made to the structure after the selected function [16].

Factors Affecting Appropriate Function Selection

Appropriate function selection in the re-functionalization phase; It is an important determinant that will directly affect the interventions to be made and be effective in the spatial shaping of the building. For this reason, the factors affecting the selection of appropriate

functions in buildings have an important place in the context of space interventions to be applied in the re-functioning process [17]. For a refunctioned structure, there are many different factors that affect the selection of the right function in its new use. If the structure to be re-functionalized; If it has historical value, there are certain intervention limits according to the degree of protection, that is, legal decisions to be followed, but these factors can be grouped under certain headings for all structures. In this study, the preferred titles for correct function selection are listed below:

• Analyzes to be made: Universal design approach; planning, design, application, use and evaluation. When re-functioning is also considered as a kind of design approach, all the analyzes that need to be done before giving new functions to the buildings should be included in the planning phase. The architectural analysis of the building or building group to be re-functionalized; functional, spatial and structural analysis. In this context; the plan scheme of the existing building, the materials used in its construction and the construction technique should be examined. These investigations are; it gives information about whether the building is in good, medium, bad or dilapidated condition. Determining the state of the building is important in terms of establishing a basis for the studies during the re-functioning [18]. In line with all analyzes and reviews; first, a survey and restitution of the current state of the building and then a restoration project should be prepared. As can be seen; all the work done before the re-functionality, together with other factors, helps to make the final decision about what the new function of the building will be.

• The Location of the Building and Its Relationship with Its Environment: The location of the building and its relationship with its surroundings is one of the important factors in determining the new function to be given to the building. Considering its location in the city in terms of access, it is important that people reach that location by any means of transportation and that the building offers easy parking [19]. In order for the building to survive for a long time with its new function, it must be in harmony with its environment. This harmony; the accessibility of the environment is directly proportional to its economic level and social life. The new function that the building will have in the urban fabric should be chosen in accordance with the economic realities and demands of the environment [20].

• Spatial and Volumetric Condition of the Building: It is known that categorizing the spatial configurations/volumes of the buildings will facilitate the selection of a new function. In order not to interfere too much with a building in a spatial sense, the new function should be selected from the category in which the spatial setup of the building in its old function is included [21]. For this reason, the buildings should not lose their essence and be shaped spatially and volumetrically according to the function they have in order to achieve positive results [22].

Interventions for Refunctioning

It is considered important that the architectural interventions to be made for the vital transformation within the scope of re-functioning should capture the harmony of the physical architectural texture, which is intended to preserve the identity value of the historical buildings and to reveal their design originality. Before the new function/s to be added to the building and the relationship established between human and space maintain the optimum value, detailed data about the current state of the building or building group should be obtained, all functional and aesthetic spatial analyzes should be made, environmental effects should be taken into account, user/employer needs should be taken into consideration. Considering this, architectural decisions should be taken for the new functionalization [23].

The style of intervention to be made for the new function/s with a harmonious or contrasting approach on the architectural style/language of historical buildings is diversified. When the harmony method is used, it consists of repetitions by considering the initial state of the structure, and simulations can be captured even if there is confusion in the concept of time on the basis of originality. Accordingly, the distinction between the time of the intervention to

be made on the building is not clear, and impressional and visual uncertainties may occur at the point of which operation and when. When the contrast/opposite method is used, the intervention to be made makes a conscious distinction clear over time layers, since the transformative fiction is handled within the architectural interpretation [24].

In this context, the interventions to be made on the refunctioning of historical buildings, the approach/s that include new moves by interpreting the existing architectural language, where the past can be remembered and traced are considered more accurate. Considering the conservation laws with certain restrictions, the interventions that bring the historical value to the forefront, even though they create limitations, direct the design fiction. During and after the decision to install a new function suitable for the building, the potential situation of the building should be evaluated in line with the needs program, and the interventions that can be made for spatial requirements against structural imperatives should be overlapped within the program) [17].

• Interventions for Spatial Pattern/Fiction: It is possible to install different function/s for structures that cannot functionally respond to needs, expectations and demands, which are shaped in line with vital concerns and priorities that change over time, through interventions made through spatial fiction. Arrangements can be made with partial interventions such as mezzanine floors, dividers, bridges, overhangs, discharges, transitions, permeability, horizontal-vertical circulation elements, etc., provided with new additions/deductions in return for the previously non-existent requirements of the new function throughout the building. In order to meet the lack of space in the building, integrating the complementary additional buildings into the building by considering the piece-whole balance is considered within the scope of interventions [16].

• Interventions on the Structural System: It covers the strengthening, maintenance and repair of the structural system due to the new functional process of the buildings, the adaptation of the existing structure and the additions against the legal obligations/regulation limitations, the placement of the vertical circulation elements against the core deficiency, the arrangement of the necessary structural elements for the additional floors and buildings. Interventions can be made to horizontal, vertical and diagonal structural elements such as columns, beams, floors, walls and tensioners, which are necessary for new arrangements within the spatial organization for the function assigned to the building [16].

• Interventions on the Lighting System: Depending on the new functioning process, the historical and cultural characteristics of the building, it is necessary to review the technical infrastructure systems throughout the building and to establish additional mechanisms in addition to their maintenance and repairs [17]. Without ignoring the conditions of the day and the function considered for the building, changing or renewing the visual-artistic interactive indoor and outdoor lighting (natural, artificial), ventilation, heating systems with a variety of changing/developing techniques and materials are considered within the scope of the intervention [25]. The quality/character of the re-functionalized structures comes to the forefront by considering the natural and artificial lighting systems used depending on the developing technological possibilities, ensuring the balance of the part and the whole, leaving a sensory/psychological effect, and creating visual and artistic attraction.

• Interventions to Facade Layout: The characteristic architectural approach, design decisions, spatial solution suggestions and facade systematics of each building of its own period provide information for important temporal learning. It is expected that the facade plane, where the interior design of the re-functioned buildings is reflected to the exterior, will be new public faces that are open to information and can establish a relationship between function, form and building, environment/human [16]. While the guiding setup of the new function imposed on the buildings affects the interior space, interventions must be made on the exterior plane for the necessary natural light.

• Environmental Approach Interventions: The physical architectural space fiction of the buildings comes together for the parts of the design whole with the interventions made while using the environmental approaches including the thematic approach in context. Supporting pedestrian-vehicle roads, parking lot, urban furniture, lighting, green space and environmental equipment, which are outside the buildings that are provided with re-functioning, increase the living standard of historical buildings [26].

Aim and Method of the Study

Buildings, which represent a document of historical and cultural heritage, have characteristics specific to the period in which they are located, and are worth preserving in order to keep them livable by keeping up with the changing social structure and life and human needs. The important thing is that these interventions should be done without damaging the building, thus the history, culture and continuity of time. Architectural touches that develop due to adaptive reusing play a decisive role in the relationship between human and space. Spatial interventions in a structure worth preserving contain data that constitute the historical and cultural memory that will be read directly by the users. In this study, it is aimed to present a helpful suggestion for the solution of the problems that the structural and spatial interventions in the adaptive reused buildings worthy of protection may cause in the historical and cultural reading of the space. Prior to adaptive reusing, it is aimed to determine the design approaches aimed at preserving the architectural integrity with the interventions constructed on the direction of the historical past of the building with spatial analysis and to develop a method in this direction.

The preservation of industrial buildings with historical value and their presentation to the society by gaining a new function, the continuity of cultural heritage, the evaluation of resources and the transfer of the building to the future by becoming a living focus raise awareness in architectural transformation. Santralistanbul, which was handled and evaluated for the study, stands out as a good example showing its transformation from the first power plant in the Ottoman period to a museum (contemporary art-energy) and education structure with its new function. In the study, literature research, fieldwork/on-site detection, observation and photography were used as a method.

Literature Search: A general literature search was conducted on the subject. Determining the causality and spatial intervention qualities required for the new function setup adopted for the designs of Emre Arolat, Nevzat Sayın, Han Tümertekin and İhsan Bilgin, sketches, photographs, drawings, notes, seminars, thesis on the subject, books and application-idea projects designed by EAA-MHT-NSMH offices until today were examined.

Field Study: At this stage, the spatial reflections of other qualities that support the design and the formations that enable the architectural interventions to be positioned in the part-whole relationship specific to the buildings located in the Santralistanbul campus, which has been transformed with its new function and architectural structure, have been identified on site. The buildings within the campus have been decided by taking into account the differentiation of the architectural space qualities it offers and the interventions (spatial setup, structural, lighting, exterior, the environment of the building) made, innovativeness beyond the ordinary, and original design thought. It has been revealed that the energy museum-gallery, law faculty, contemporary arts museum and architecture faculty-library, which were selected and examined on-site, are an effective example among industrial structures that have been adaptive reused. The data obtained from the examined structures were interpreted by converting them into graphical tables for physical intervention analysis.

Scope of the Study: The Santralistanbul project aims to transform the Silahtarağa Power Plant into a science, culture and art complex that includes various functions such as some education departments of Bilgi University, an energy museum, a gallery, a library, a contemporary art museum, exhibition areas, restaurants, cafes and recreational open spaces. In order to understand the historical position and social-urban effects of the buildings, which have

completed their adaptive process in the Santralistanbul campus and come to the fore as an industrial structure worthy of protection; their architectural situations have been researched. For the selection of buildings that will set an example in terms of the analysis method for spatial interventions, the data obtained as a result of the observations and researches were evaluated, and it was decided to examine the energy museum-gallery, law faculty, contemporary arts museum and architecture faculty-library buildings. The criteria previously determined as the analysis method for spatial interventions were discussed on these selected buildings one by one, and the interventions that the building underwent during the adaptive reusing process were evaluated.

History, Architectural Structure and Spatial Pattern of the Power Plant

The Silahtarağa Power Plant, which was established in 1913 next to the Eyüp Alibeyköy and Kâğıthane streams; it is Turkey's first thermal power plant (Fig. 1). For electricity distribution covering the Rumeli and Anatolian sides, the Silahtarağa region, where the streams flow into the Golden Horn, was chosen as the facility area because it is in a central/suitable location [27]. Although the facility, which was built on an area of approximately 120,000 m², was active in 1914 and started to serve, it was closed in 1983 due to technical inadequacy and environmental pollution [28]. Differentiating in its modern building style, the power plant was registered in 1991 as an industrial building, and its re-planning and function came to the fore [29].

The building restoration works, which were started by being allocated to Istanbul Bilgi University in 2004, were partially completed in 2007 but the transformation/change activities that responded to the requirements for the education campus continued [30]. Boiler-machinery rooms, water channels, transformer, lodgings, clubs and bridges over the stream in the power plant were kept within the scope of protection and were evaluated as the most important parts of the architectural whole in the campus by re-functioning [31]. While the new function and structural setup of the power plant was realized in partnership with Emre Arolat, (EAA), Han Tümertekin, Nevzat Sayın (NSMH), İhsan Bilgin, the architectural organization of the campus was brought to the fore with the restoration of old buildings and the design of unique new additions (Fig. 2).

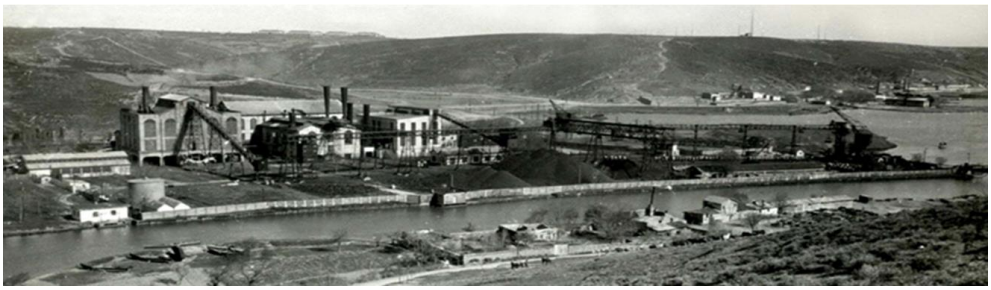


Fig. 1. Before re-functioning, Silahtarağa Power Plant (image by NSMH Archive)

Fig. 2. Santralistanbul Campus after re-functioning (image by NSMH Archive)

The traces of design, which show the recent history of the power plant and express concrete data over the past and experiences, strengthen the discourses about the future. Santralistanbul, which provides services by preserving and taking on new functions, has gained its new identity that produces art and science.

It can be read on the site plan that the settlement plans of the buildings in Silahtarağa before re-functioning were designed in line with the needs of the power plant (Fig. 3). The new functionalizations that emerged with the transformation to Santralistanbul affect the intervention decisions that improve/change the status of existing structures. The recovery of the historical buildings left idle and the search for different alternative answers to the education-oriented requirements required for the campus are provided through new functions and usage patterns. While historical buildings, which have architectural touches according to their structural conditions, continue their existence, changes show continuity in response to spatial inadequacies and the old-new function dialogue is kept alive (Fig. 4).

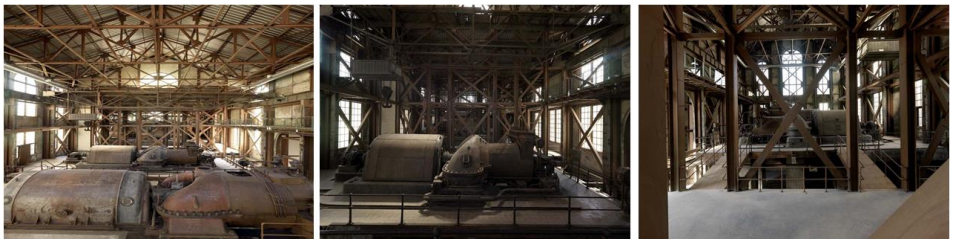


Fig. 3. Interior views before adaptive reuse, Silahtarağa Power Plant (image by NSMH Archive)

Fig. 4. Santralistanbul old-new function dialogue (image by EAA Archive)

1 Energy Museum
2 Gallery
3 Faculty of Law
5-7 Museums
4-6 Faculty of Architecture and Library
8-9-23 Administrative building
10 Lodgings
13 Artist guesthouses
14 Consultation
17-20 Eating and drinking
E Education structures

Fig. 5. The site plan for 2005, the layout schemes of the buildings (image by NSMH Archive)

The buildings designed for production, warehouse and service purposes with the density of registered damaged buildings within the building complex are transformed and make the campus a focal point with its new functions. Buildings numbered 1-2 are converted into galleries and energy museums, buildings numbered 3 are converted to the faculty of law, buildings numbered 4-6 are converted to the faculty of architecture and library, and buildings numbered 5-7 are converted into a contemporary arts museum (Fig. 5).

Energy Museum-Gallery

Engine rooms, which provide urban electricity and are remembered with their formal setup, are repaired with physical interventions and serve as an energy museum today with their new functionality (Fig. 6). Restoring and protecting the structural parts that are seen as industrial heritage establishes a relationship of belonging and strengthens the identity formation integrated with the place. The addition of the boiler room, which has been idle, neglected and closed for years, to the city with their new function, is a necessary step for an open and flexible planning that connects users in the historical process, offers dialogue between experiences, catches different perspectives [32]. In addition to giving its visitors the opportunity to participate in education programs on electricity and energy, the museum also provides information on the history of Silahtarağa Power Plant, energy saving and electricity generation. The ability to carry out activities with electrical themed units in the energy playground and attracting the attention of all age groups, promotes the original identity and mission of the building by keeping it alive [17].

Fig. 6. Energy Museum-Gallery before conversion (image by NSMH Archive)

Faculty of Law

The historical building, which houses the energy tribunes, designed by Seyfi Arkan in 1947, comes to the fore with a process between what is possible and what can be in line with its new function. Considering the dimensional conditions of large volumes, the spatial requirements required for the faculty are supported by reinforced carrier systems, focal formation of protected tribunes and additional circulation/cores [33]. The original parts of the historical building complete the unfamiliar process through new functions, through different perspectives that include the user/student with the idea/thought of justice (Fig. 7).

Fig. 7. Faculty of Law before conversion (image by NSMH Archive)

Museum of Contemporary Arts

The building, which was used as the Museum of Contemporary Art with its new function, used to have boiler rooms (Fig. 8). While foundation traces and collapsed body walls guide the newly constructed design in the contextual process, height and widths were preferred for the base of the formal formation [34]. In response to the new function's requirement, the exhibition spaces are illuminated by daylight, while gray small-perforated aluminum tulle has been brought to the fore for the façade background that wraps the building above the ground

and adds originality [32]. The dynamic approach, which changes according to the current weather conditions and adds movement to the building, was supported by lightings by considering the transparent-opaque balance. The gray neutral image, which strengthens the interior-exterior interaction and prepares the ground for different visual presentations, shows its presence in the historical complex with a new architectural language/style [30].

Fig. 8. Museum of Contemporary Arts before conversion (image by NSMH Archive)

Faculty of Architecture-Library

Although the boiler rooms, built in 1914, were abandoned in 1983, it was decided to protect them as they are industrial heritage and periodical special structures. Within the scope of re-functioning, many detailed studies were carried out and a visual and communicative link was established between the floors in order to meet the spatial requirements with approved dismantling and reinforcements [33]. The old boilers were subjected to special processes and left in their original state, increasing the strong past effect of the building and highlighting the importance of spatial value/standard (Fig. 9). While the interconnected studios, model workshop, and exhibition area are distributed as an open layout throughout the building in line with the principle of transparency, the jury area supported by the library completes its spatial pattern with its studios and faculty rooms. The interaction between the interior spaces enriched by the galleries that support the open space setup and the existing structure strengthened by the use of the steel structure, while respecting the past, makes its own architectural understanding felt.

Fig. 9. Faculty of Architecture-Library before conversion (image by NSMH Archive)

Analysis of Interventions for Refunctioning

Societies; can protect its historical and cultural characteristics as much as they can adapt these values to the present. The re-emergence of structural features, the necessity of being perceived and understood by the environment, highlights the importance of interventions for re-functioning. Refunctioning; it reveals two concepts in the form of reprogramming and rearchitecture design. Reprogramming, while arranging the space in term of usage, makes the physical conditions of the building suitable. Re-architectural design, on the other hand, includes interventions to be made within the possibilities given by the style and technique of the time the building was built. The energy museum-gallery, law faculty, contemporary arts museum and

architecture faculty structures selected from the Santralistanbul sample area for re-functioning were examined separately, their situations were evaluated, the interventions were determined, compared and analysis tables were created (Table 1, Table 2, Table 3, Table 4).

Table 1. Analysis of interventions for re-functioning, Energy Museum-Gallery (Created by the author)

ENERGY MUSEUM-GALLERY SETTLEMENT PLAN

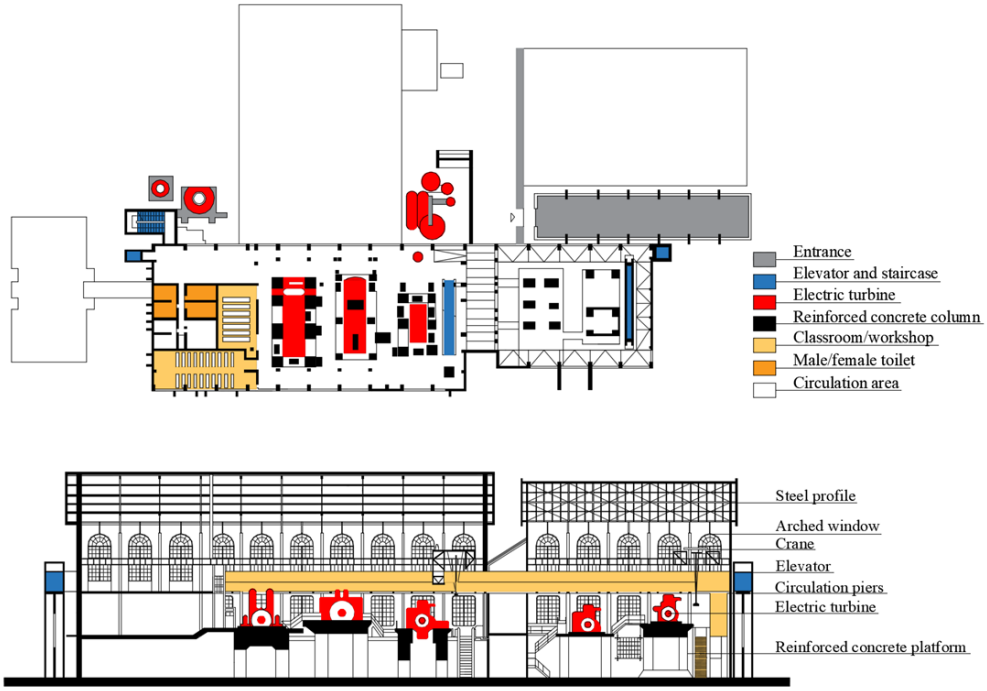
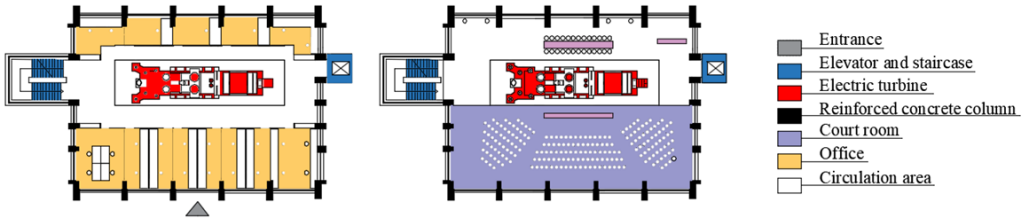

ENERGY MUSEUM-GALLERY


Table 2. Analysis of interventions for re-functioning, Faculty of Law (Created by the author)

FACULTY OF LAW SETTLEMENT PLAN

FACULTY OF LAW



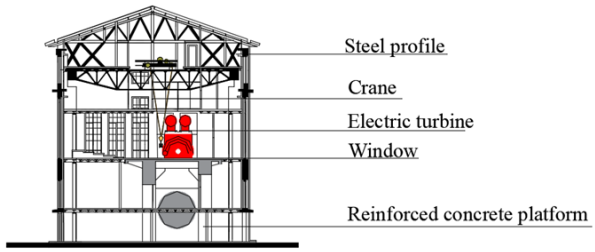


Table 3. Analysis of interventions for re-functioning, Museum of Contemporary Arts (Created by the author)

MUSEUM OF CONTEMPORARY ARTS SETTLEMENT PLAN

MUSEUM OF CONTEMPORARY ARTS

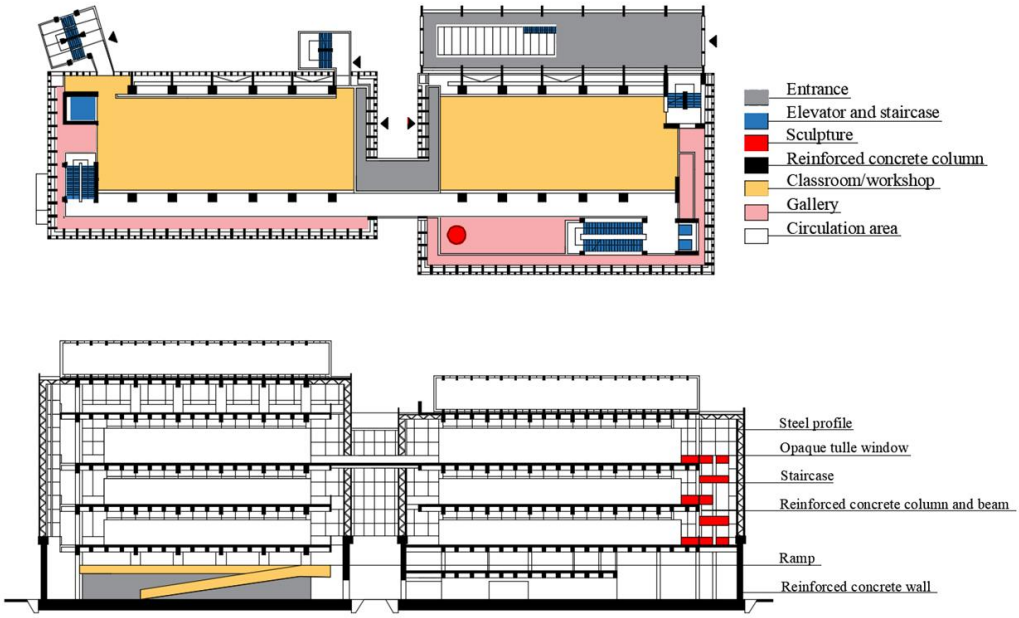
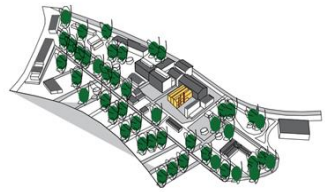
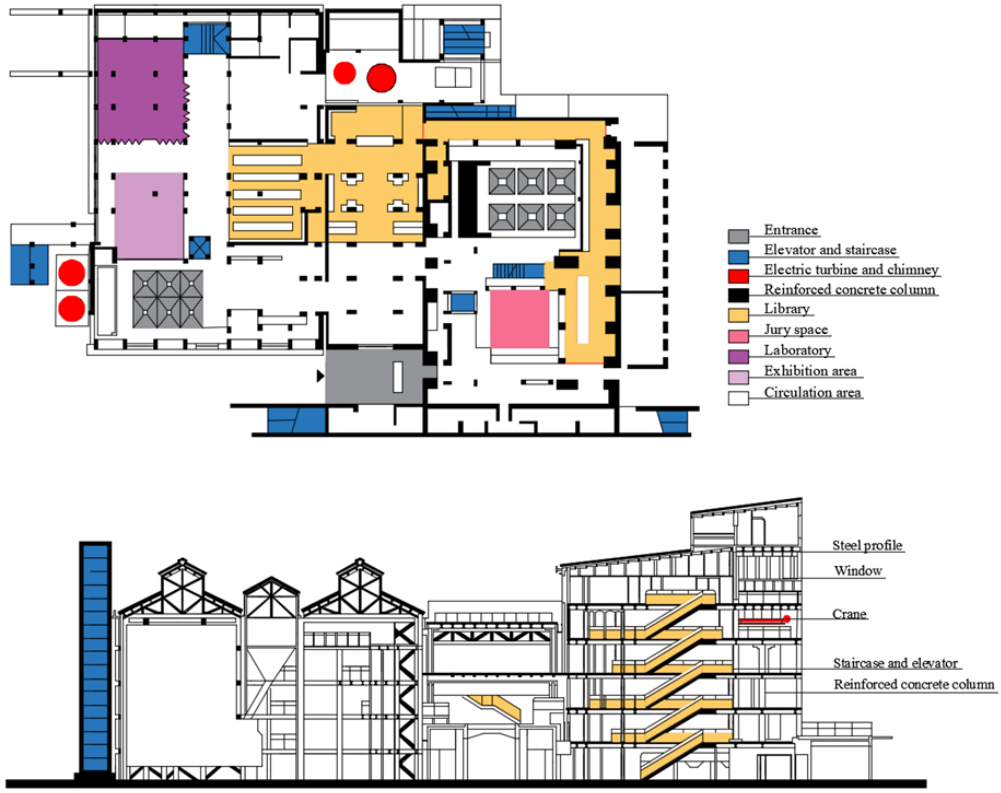


Table 4. Analysis of interventions for re-functioning, Faculty of Architecture-Library (Created by the author)

FACULTY OF ARCHİTECTURE-LİBRARY SETTLEMENT PLAN
  

FACULTY OF ARCHİTECTURE-LİBRARY


Results and Discussions

Santralistanbul, which shows change/transformation with re-functioning; It develops an architectural language/style that does not hide the spatial and temporal traces and enables the distinction between the past and the present. Interventions that direct the design setup so that visitors/users/students become aware of the old and the new and read the layers created by time are analyzed separately in the selected examples of the Energy Museum-Gallery, Faculty of Law, Museum of Contemporary Arts, Faculty of Architecture-Library and analyzed within the scope of re-functioning, and the following findings are reached:

Energy Museum-Gallery

Two main interventions, consisting of steel reinforcement and excursion scaffolding, come to the fore in the refunctioned structures 1 and 2. The corrosion of the existing turbine-generator groups in the engine rooms has been prevented, and the metallic parts and pipes with the connector parts have been protected. Inter-floor connection is provided by guiding the strengthened structural structure with the formation of escalators, elevators and linear scaffolding. The control room, control devices and all equipment in the engine room number 1 were cleaned and preserved as a whole, and missing parts were marked. The gaps created by the missing indicators on the control panels are covered by using transparent plates. Due to the spatial arrangements and artistic activities that include modern and cultural activities, an area where energy is transformed into knowledge has been created. There are sections where visitors can generate their own electricity and make various experiments. On the ground floor, the irregular pipes and equipment containing unhealthy insulation materials were purified and transformed into a science and amusement park. In this way, the two buildings are connected to each other spatially and functionally.

The structure of the building, whose structural system is reinforced concrete and steel construction, did not undergo any visual changes by making reinforcements. The load-bearing system has been exhibited together with the existing mechanical parts in the interior, highlighting the openness/protrusion of the added horizontal and vertical circulation elements. The wall surfaces between the axis system and the row of 15 long arched windows were repaired and preserved, and the need for natural light from the outside was met. The level and effect of the exhibition has been increased by using LED lamps of different colors in and around the industrial pieces exhibited indoors. The variation of the height differences of the original metallic parts in different sizes gained fluidity with the artificial lighting provided. The rhythmic facade layout, which prepares the inside-out relationship and adds a visual identity to the building, has not been altered, the wall surfaces have been repaired and painted, and elevators have been added to the horizontal ends of the excursion scaffolding (Fig. 10).

Fig. 10. Interior views after adaptive reuse, Energy Museum-Gallery

Faculty of Law

The spatial requirements of the Faculty of Law have been distributed environmentally, by completely preserving the volume where the energy turbines, which form the interior focus

of the re-functionalized building 3, are located. The fact that the spatial width is not lost and referenced to the past has been supported by the alternative meeting, seminar, lecture function in the courtroom identity, and the new colored seating arrangement. By making spatial distribution between floors, the reinforced concrete turbine base was surrounded by steel gallery areas on 2 floors, and the crane and hook were preserved in the repaired gallery space on the large volume. The reinforced concrete carrier system was strengthened and the new floors added were supported by the steel system, and stairs and elevators were placed outside the building, which ensure the continuity of circulation. The spatial dimensions were developed over the height of the existing building, the meeting room, wet areas, offices were defined and the courtroom was left open and accessible by intervening with the dividing walls.

The exterior of the building was preserved and repaired without any formal changes, and daylight was taken into the interior from the existing window series. The light, which lost its continuity with the addition of mezzanine floors, was balanced with the formation of a gallery. In line with the spatial requirement, rail spots were placed on the ceilings and regional lighting was provided. Although the exterior facade system was preserved by leaving the formation of the mezzanine floors, which were supported by the steel system in the interior, on the wall surface, the elevator and stairs added later covered the existing wall surface. The 5 wall surfaces between the axles were repaired by considering their former condition (Fig. 11).

Fig. 11. Interior views after adaptive reuse, Faculty of Law

Museum of Contemporary Arts

Boiler rooms of buildings 5 and 7, which were re-functionalized years ago, were transformed into the Contemporary Arts Museum by preserving only the outer contours. The foundation traces and the design orientation of the reinforced concrete floor wall provided the integration of two separate structures and the mass-part relationship differed in the surface formation. The concept of contemporaneity was developed by keeping up with the historical context through contemporary architectural concerns, and designed to support site-specific criteria contrary to the usual current trends. Although its new function is a museum, the building continued its change/transformation in the interior organization in line with the increasing number of students and spatial requirements, and different gallery areas, offices and classrooms were added to the floors.

The structure system of the building is a new design, it is out of date and has been applied as reinforced concrete over the traces left by the ruins. The exposed concrete podium and the metal mesh covered steel construction rising above it reflected the concept of the building as a whole. Between the niche-formed ground floor and the other floors with a gallery, plain reinforced concrete walls, stairs and columns are preferred without coating. In the interior, the use of white and gray colors on the floor and wall surfaces allowed to create a neutral effect inside the historical facility. In this way, the new structures added to the historical texture did not get ahead of the old ones and did not harm the visibility of the historical accumulation. The neutrality of the building also contributed to the visibility of the works to be exhibited in the interior. A semi-permeable shell that does not touch the inner core and the outer façade has been added to ensure circulation. Small perforated aluminum mesh material was used on the

exteriors of the masses, thus allowing daylight to be taken into the interior. At night, with the help of the lighting applied in the interior, a transparent volume impression is created in the building (Fig. 12).

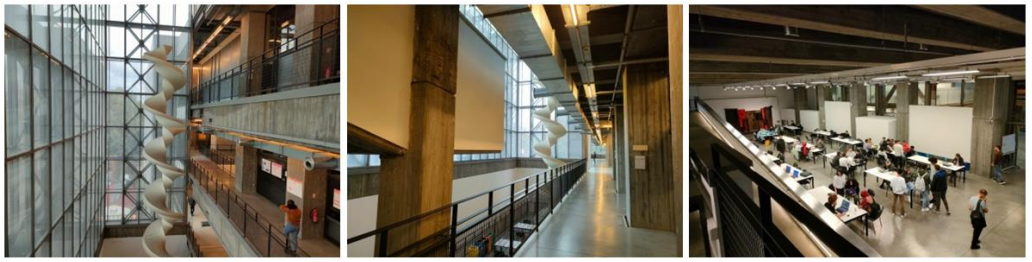


Fig. 12. Interior views after adaptive reuse, Museum of Contemporary Arts

Faculty of Architecture-Library

Boiler rooms numbered 4 and 6, which have physically survived to the present day and have a conservation decision, were designed as an architecture faculty and a library by giving new functions. The open and transparent space orientation setup of the education structure brought together the needed classrooms, studios, laboratories, workshops, social spaces, technical and administrative units in a single volume. These structures have been transformed into interaction/communication spaces in a way that they can relate to each other, and have acquired their own physical characteristics in which existing historical data are evaluated. The gallery spaces created between the newly added floors and the workshops support the open space setup. The gathering of the Faculty of Architecture in terms of the workshop layout, the function of the exhibition and jury spaces made it accessible/visible to everyone. Undergraduate studios and exhibition areas are located in the boiler room number 4, while the library and jury areas, lecturers rooms and common studio areas are located in apartment 6. The main entrance is planned at the junction of the two buildings, creating the opportunity to pass through different units.

Reinforced concrete is preferred as the carrier system in educational buildings. In the required wide openings, the steel structure supporting the open space setup was used. The structure, which was created with reinforced concrete walls and floors, was completed with steel columns. Chimneys and silos located outside the building were also renewed and exhibited in their original form. In the project, which is a very respectful approach to the original of the building, a new design was made to create a library while preserving the boiler room. By setting up the library area between two boiler rooms on the ground floor, a space was created that connects the buildings to each other. The new space, which is defined as the entrance in the area located in the middle of the two boiler rooms and is designed as a part of the library and a part of the common use area, has carrier and top cover annexes. A jury area was created for the faculty of architecture on the ground floor of the 6th boiler room so that the level difference would be provided. While the gallery structure of the jury area is brought to the fore with the tearing of the added floors, the visual effect between the circulation areas and the spaces is increased.

The existing shell, which was built to protect only the boilers while being built, has been reconsidered in order to provide the appropriate building physics conditions while the structures are being re-functioned. For this purpose, a new shell was designed inside the old building. In the old outer shell, openings were created to benefit from daylight in accordance with the

original facade appearance and structure. The original windows were extended to the floor, the existing doors and stairs were removed, and a floor-to-floor window was added instead of the removed door. Interventions to the spatial setup have created a new circulation scheme in the space with function, and accordingly, stairs and elevators have been added. In this way, the boundaries of the circulation areas were determined. Additional stairs and balustrades are designed with materials and colors compatible with industrial structures, and the balustrades are positioned as spaces. The carrier elements added to the building were painted in different colors and left visible with the installation system (Fig 13).

Fig. 13. Interior views after adaptive reuse, Faculty of Architecture-Library

The importance of the interventions made within the scope of the re-functioning of the idle buildings and their surroundings in the Santralistanbul campus was observed in the part-whole, figure-ground relationship. Accordingly, landscaping works were carried out in the immediate surroundings, pedestrian-vehicle roads, parking lot, courtyard, square were arranged, water-green-lighting, sign-information signs, outdoor furniture-covers, artistic objects-sculptures were added. In addition, in the re-functioning project, new spaces were designed considering the original structural features of the spaces. Environmental interventions were considered important for identity formation, and original designs were required for maintaining urban life and establishing personal/group relations/ties.

Conclusions

Conservation of historically valuable industrial structures and their adaptive reusing to social life is considered very important in terms of protecting cultural heritage and utilizing existing resources. By adaptive reusing, it is ensured that the architectural traces of the historical buildings that were left to aging/demolition are traced and the cultural memory is kept alive through the experiences of the past. Historical buildings maintain their unique intellectual characteristics and the culture of the place/city they are located in, by staying in use and living in order to transmit them to future generations. For this reason, it should be aimed that the changes that will be a part of the historical continuity do not harm the character and structure of the building and that the building is in harmony with the whole, while making them livable by assigning new functions to the buildings. The adaptive reusing understanding of industrial buildings, which brings them back to society, can save the buildings from extinction with the right planning and function. Buildings that have been adaptive reused with cultural, social and societal developments can highlight their importance and value with the information they carry, the technical/technological data of the period in which they were built, their architectural and artistic features.

While the unused historical buildings in Santralistanbul campus are intervened for their new functions in line with the determined purposes, it is aimed to protect the urban memory, transfer it to the future and create the urban identity. While these historical buildings, which are dysfunctional according to cultural, economic and social developments, are reintroduced to the society with the understanding of adaptive reuse, they can continue to be important and valuable with their knowledge, sociocultural value and architectural features of the period they were built. In this context, the protection of Santralistanbul, which offers historical documents/traces in terms of architecture, is shaped according to the emphasis on the differences/qualities that reflect the past and the spatial interventions between the part-whole relationships that responds to current uses. Santralistanbul is a good example showing that the physical structure of the building community, which was used as a power plant in the past, can be changed by the combination of education, culture and art dynamics with new functions and architectural interventions. The energy museum-gallery, law school, contemporary arts museum and architecture faculty buildings wich was selected from the Santralistanbul sample area are protected, as the architectural interventions made within the scope of adaptive reusing include the right decisions in accordance with the original, and the historical structures in the central campus. The new function/s given for the protection and continuity of historical buildings should be in accordance with the cultural semantic value of the building, the social benefit should be taken into account, and the original state/parts of the building should be respected in the interventions to be made.

In the light of all the researches, examinations and determinations within the scope of this study, the reuse of structures worthy of protection in line with changing needs by adaptive reuse is a proof that they are sustainable over time. The important point is that the space interventions required by the adaptive reuse phenomenon are made without damaging the characteristics of the buildings worth preserving, and these characteristics can be transferred to future generations as "cultural heritage". It is thought that the findings obtained as a result of the research will contribute to the studies conducted in this field by evaluating the spatial interventions in structures worth protecting and the spatial importance of industrial structures worth protecting, which is an issue that is examined by many different disciplines today and should be handled with sensitivity.

References

[1] M. Binney, F. Machin, K. Powell, **Bright Future: The Re-Use of Industrial Buildings,** SAVE Britain's Heritage, London, 1990.

[2] C. Phoebe, *From Industry to Culture: Leftovers, Time and Material Transformation in Four Contemporary Museums,* **The Journal of Architecture, 12**, 2007, pp. 405-421. https://doi.org/10.1080/13602360701614698.

[3] T. G. Köksal, *Yeniden Hayat Bulan Endüstri Yapıları,* **Domus, 8,** 2000, pp. 68-71.

[4] G. Önkal, *Dönüşen Kentlerde Değişen Kimlikler: Toplumsal Bellek ve Özgürlük Yitimi,* **Mimarist Dergisi,** 2012, pp.101-106.

[5] R. B. Ay, *Özgün İşlevini Yitirmiş Endüstri Mirası Yapıların Yeniden Kullanımda Uygun İşlev Seçimi: İstanbul Çengelköy İspirto/Suma Fabrikası Örneği,* **Master Thesis,** Mimar Sinan Fine Arts University, İstanbul, 2013.

[6] D. Piran, *Endüstri Yapılarının Yeniden İşlevlendirilmesi,* **Master Thesis,** Mimar Sinan Fine Arts University, İstanbul, 2016.

[7] P. Robert, **Adaptations: New Uses for Old Buildings,** Princeton Architectural Press, New York, 1989.
[8] Ü. Altınoluk, *Endüstri Arkeolojisi Kapsamındaki Binalarda İşlev Dönüşümü,* **Architecture Magazine, 292,** 2000, pp. 7-8.
[9] D. Kuban, **Tarihi Çevre Korumanın Mimarlık Boyutu Kuram ve Uygulama,** Yapı Endüstri Merkezi Yayınları, İstanbul, 2000.
[10] E. Burden, **Illustrated Dictionary of Architectural Preservation: Restoration, Renovation, Rehabilition, Reuse,** McGraw-Hill Press, New York, 2004.
[11] Ş. B. Emre, *Sanayileşme ve Sanayi Yapılarının Yeniden İşlevlendirilmesinin İstanbul'dan Örnekler Üzerinde Analizi,* **Master Thesis,** Mimar Sinan Fine Arts University, İstanbul, 2008.
[12] Z. Ahunbay, Tari**hi Çevre Koruma ve Restorasyon,** Yapı Endüstri Merkezi Yayınları, İstanbul, 2019.
[13] Y. Kocabıyık, *Yeniden İşlevlendirme Kavramı ve Bu Kapsamda İTÜ Taşkışla Binasının İncelenmesi,* **Master Thesis,** Maltepe University, İstanbul, 2014.
[14] G. Beltramini, I. Zannier, **Carlo Scarpa: Architecture and Design,** Rizzoli International, New York, 2007.
[15] Ö. Uçkan, *Korumadan Yeniden İşlevlendirmeye Sürdürülebilir Kent,* ***Domus*****, 8,** 2000, pp. 36-37.
[16] P. Frederic, A. F. Miller, **Architectural Conservation,** Alphascript Publishing, New York, 2010.
[17] A. Şentürer, *İnsanın Uyum-Yaratma İkilemi ve Mimaride Eski-Yeni Tartışması*, **Yapı Dergisi, 159,** 1995, pp. 40-48.
[18] D. Kincaid, **Adapting Buildings for Changing Uses,** Spon Press, London, 2002.
[19] K. Powell, **Architecture Reborn: The Conversion and Reconstruction of Old Buildings,** Laurence King Publishing, London, 1999.
[20] C. Balocco, G. Grazzini, *Plant Refurbishment in Historical Buildings Turned into Museum,* **Energy and Buildings, 39,** 2007, pp. 693-701. https://doi.org/10.1016/j.enbuild.2006.06.012
[21] Ü. Altınoluk, **Binaların Yeniden Kullanımı,** Yapı Endüstri Merkezi Yayınları, İstanbul, 1998.
[22] F. S. Kariptaş, *Endüstriyel Miras Kavramı Çerçevesinde Endüstri Yapılarının Yeniden İşlevlendirilmesi ve Elektrik Santralleri Örneği Üzerinden Analizi,* **PhD Thesis,** Mimar Sinan Fine Arts University, İstanbul, 2019.
[23] P. Arabacıoğlu, I. Aydemir, *Tarihi Çevrelerde Yeniden Değerlendirme Kavramı,* **Megaron, 4**, 2007, pp. 204-212.
[24] B. Kaşlı, *İstanbul'da Yeniden İşlevlendirilen Korumaya Değer Endüstri Yapıları ve İç Mekân Müdahaleleri: Santraistanbul Örneği,* **Master Thesis,** Istanbul Technical University, İstanbul, 2009.
[25] Z. İnan, *İşlevini Yitirmiş Tarihi Yapıların Büro Yapılarına Dönüştürülmesindeki Mekânsal Sorunlar*, **Master Thesis,** Halic University, İstanbul, 2013.
[26] S. Kona, *Paşalimanı Un Fabrikası ve Yeniden İşlevlendirme*, **Master Thesis,** Maltepe University, İstanbul, 2015.
[27] İ. Bilgin, **Bir Mimari Eser Olarak Silahtarağa Elektrik Santrali, Silahtarağa Elektrik Santrali 1910-2004,** Istanbul Bilgi University Publications, İstanbul, 2007.
[28] A. Aksoy, **Silahtarağa Elektrik Santrali 1910-2004,** Istanbul Bilgi University Publications, İstanbul, 2007.

[29] G. D. Okandan, *İşletmecilik Tarihinde Modern'den Postmodern'e Bir Yolculuk: Silahtarağa Elektrik Santrali'nden Santralistanbul'a Süreklilik ve Değişim,* **Journal of Istanbul University Faculty of Business Administration, 45,** 2016, pp. 40-48.
[30] E. Arolat, İ. Bilgin, N. Sayın, H. Tümertekin, *Santralistanbul,* **Yapı Magazine, 313,** 2007, pp. 52-70.
[31] B. Kıraç, M. Kaptı, *Monografik Bir Çalışma: Silahtarağa Elektrik Fabrikası,* **VIII Eyüpsultan Symposium,** 7-9 May 2004, İstanbul, Turkey.
[32] E. Arolat, *Endüstri Mirası Konusunda Öznel Deneyim: İncelik ve İtina*, **Ege Mimarlık, 70,** 2009, pp. 26-31.
[33] N. Sayın, *İstanbul Bilgi Üniversitesi Hukuk Fakültesi,* (02.08.2022) https://www.nsmh.com/Istanbul-Bilgi-Universitesi-Hukuk-Fakultesi
[34] Arkitektüel, S*antralistanbul,* (02.08.2022) https://www.arkitektuel.com/santralistanbul/

Received: September 10, 2023
Accepted: July 25, 2024