From Dysfunctional Industrial Zone to University Campus

Ahmet Kurnaz

***Abstract*—** The aim of the study is to reveal the need to consider industrial structures as a form of cultural heritage which have become the symbols for industrialization and modern architecture in the world, within the context of the transfer of urban identity and urban memory to the future and to analyze the process where these structures are protected and adapted to contemporary life.

The subject was studied based on a case that was re-functionalized from the industrial zone for education in university. Determining the factors to be taken into consideration when refunctioning the structures and determining the advantages and disadvantages of the refunctioning of industrial structures as a university structure, were identified as the other objectives of this research.

***Index Terms*—** university campus, refunctioning, industrial zone, santralistanbul.

I. Introduction

Human beings as the elements of the natural environment had begun to produce their own structures for the fulfillment of their needs in terms of protection, accommodation, and various other needs within this environment where they belong in time. Thus, they started the process of forming an artificial environment within the natural environment.

The artificial environment reflects the knowledge, technology, and social values of the society of a period. Structures in the form of architectural heritage coming out as the embodiments of history have witnessed and shed light upon the history of societies from the past to the present. Protecting these structures which are a part of the public memory to help them survive and adapting them to current needs will enable the sustainability of history and culture. In addition, the structure will regain value with its new function. Refunctioning is a contemporary method to revive structures with cultural value [1].

Industrial structures found in the suburban areas and the ones in the center now are among the key potential areas in the continuing transformation process. Refunctioning, a contemporary restoration method, can be preferred in the protection of industrial structures with large spatial areas which were founded for manufacturing purposes and developed with the effect of the modern era [2].

Industrial structures which have lost their original function need to possess certain features so that they can get re-functionalized in the university campus. A review of the literature on the subject reveals several opinions [3].

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II. REFUNCTIONING

Refunctioning means that a structure is reconsidered on a needs basis, in a way different from other transformational intervention methods and with a contemporary function other than the original function of such structure. In general, it could be stated as an intervention in terms of design. If we broaden this definition, refunctioning means that physical assets that have become useless with their current function are protected and put into the service for people again after they have been re-functionalized [4].

If the structure to be re-functionalized is a structure that is worth preserving, then the meaning of the word “refunctioning” is moved to a different dimension. Refunctioning of a structure means that the structure is functionally used by enabling its contemporary utilization through several adaptations, and its spiritual values are transferred to future generations by making the structure liveable [5].

In terms of time and place, transformed structures are values that reach out to the future with the traces of the past. Buildings ensure the continuity of time as the symbol of society with their documentary qualities. Therefore, they are very important for those using and visiting the re-functionalized structure to see the traces of the past and recognize the historical identity.

Carrying out maintenance and repair and introducing through several interventions, new functions for structures that have become worn out and insufficient in time, or that have been abandoned and disused, is deemed to be advantageous for the transfer of historical and cultural elements to modern times and economy [6].

https://doi.org/10.17758/EARES11.EAP1222309

The primary advantages of assigning new functions to current historic structures and areas are that; the economy and resources will be used well, historical structures can self-finance, an architectural identity and public memory will be established, and the cultural heritage, environmental factors and natural resources will be used in a positive way.

Interpreting preservation as making use of the available stock of structures reveals the economic aspect of refunctioning. In terms of economy and best utilization of resources, preserving and refunctioning of available historical structures is not a luxury but prudent utilization of one of the most important environmental assets [7].

Therefore, when the concept of preservation and refunctioning is isolated from its historical context and the available stock of structures is used for the artificial environment, it will gain a more comprehensive and realistic meaning.

Certain determining factors should be taken into consideration during the assignment of new functions. The most important of these determining factors are the boundaries of the current structure posing the basic architectural problem of refunctioning. In this respect, it is inevitable in refunctioning that the function follows form.

"Utilitas, "i.e., utility, which is one of the basic concepts for architecture defined as "utilitas, firmitas, venustas" by Vitruvius, is important for architecture. While the new function is a function other than the original function of the structure, the condition "form follows function" is replaced by the condition "function follows form" in refunctioning [8].

When assigning a new function to a historic structure, its architectural and spatial qualities should be considered well. The harmony between the new function and the attractive technical and architectural details of historical structures created as an industrial structure, should be resolved with data from structure, which means, the design process to be introduced for the purpose of the reconsideration of the historic structure with a new function should never be considered with the freedom of design possessed when forming a new structure.

Interventions made during refunctioning can be discussed under two topics: interventions to the spatial organization (divider annex intervention, movement annexes intervention, new place annexes intervention) and interventions to the structural system (installation system interventions, façade interventions, and interventions to the close surrounding).

In a structure that is worth preserving, sections that are recently added in parallel with the need for new functions, should not give permanent damage to the original elements of the structure and should be reversible. The modification should have a minimum permanent intervention on the original building. The original condition of the structure should be preserved and the transformation technique and annexes to be applied to adapt the structure to a different period, should be in harmony with the functions of the structure. The key point in such interventions is to prefer a way of intervention that fits the identity of the place and respects such a place. Creating a suspended floor in the place or making divisions with elements such as partition walls as required by the new function of the place, should be realized in a reversible and flexible way [9].

III. Silahtaraga Power Plant– Istanbul Bilgi University

Situated in the district of Silahtarağa, the Silahtarağa Power Plant was built at the mouth of the Kağıthane and Alibeyköy rivers in 1913 as Turkey's first coal-fired power plant. Located at the Golden Horn, the oldest industrial center of Istanbul, the factory's architecture bears the characteristics of the First National Architectural Movement. Having a total area of 118.000m2, Silahtarağa Power Plant has engine rooms, boiler rooms, production units comprising auxiliary units, lodging buildings, a kitchen, dining hall, and local buildings. It is a modern industrial campus that completed its evolution and expanded in forty years between 1919 and 1950 (Fig. 1).

Fig. 1 – Silahtarağa Power Plant [17].

By preserving the Silahtarağa Power Plant with the protocol signed with the Ministry of Energy and Natural Resources in 2004, Istanbul Bilgi University started the functionalization of the power plant as a center of education, culture, art, and museum (Fig. 2) [10].

Fig. 2 – Istanbul Bilgi University SantralIstanbul [17].

General planning and decisions in the Santral İstanbul project were determined by İhsan Bilgin, Emre Arolat and Nevzat Sayın. Han Tümertekin joined in the project in the next stage. The survey and restitution projects for the Silahtarağa Power Plant were carried out by DS Architecture Office.

As part of the project, the Contemporary Art Museum was designed by N. Sayın and E. Arolat and Energy Museum by H. Tümertekin, and other education units by N. Sayın. However, the Contemporary Art Museum building and the boiler rooms refurbished as a library were renovated to include additional education units in accordance with the demands of the university. The project of refunctionalizing the arrangements in question and the Seyfi Arkan building belongs to Nevzat Sayın.

Some challenges were faced while transforming the Silahtarağa Power Plant. The transformation of the sole functional power plant complex into a multifunctional university campus required a conversion program that conflicted with the purpose of the premises in the first place. The refunctionalization of the spaces, where energy generation was the sheer focus, therefore, housing people and directing the human movement were of secondary importance by the function education, and culture were considered as the architectural challenges of the transformation [11].

As part of the project, the defunct factory structures were refunctionalized by restoration and as for some new functions, new buildings were constructed. The functions performed within the project included the functions of education, culture and art such as a museum, exhibition, classroom, library, and atelier.

Buildings are comprised of 3 parts: classes, offices and slices of galleried space in between. The slices of space between the offices and classes contain functions such as a staircase, elevator, WC, and kitchen as well as a gallery and lounge. Moreover, fire escape stairs were not included in the building as additional but for daily use. It is possible to notice the flexible design interventions.

Due to their industrial structures, the boiler rooms were not designed for humans and the human circulation but for the sole purpose of hosting the boilers inside. Owing to this feature, the boilers that belong to the structure's original quality were preserved as much as possible and a new structure inside the entire volume of the structure was designed. Furthermore, the large space of the structure poses an advantage for its transformation. In order for the entire volume of this structure to be perceived, new storeys along with gallery spaces were formed. Again because of the presence of the boiler room, a circulation area was designed between only the power plant building and the structure for the passage of the employees. Therefore, it did not have an entrance door and entrance space in its original form. It became inevitable to add a new space to the structure as the entrance space [12].

During the process of refunctionalization carried out in the Silahtarağa Power Plant boiler rooms 4 and 6, an additional one-storey building was designed to connect the boiler rooms which were independent of each other. In the boiler rooms, where human use was not included in the original function, the requirements of the educational function were solved in a horizontal manner in accordance with the different perspectives of the designers as well as exhibiting its original function while defining the new function (Fig. 3).

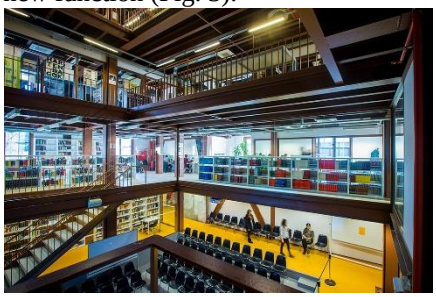

Fig. 3 –Faculty of Architecture [17].

As for the refunctionalization of the engine rooms 1 and 2, two main interventions in the structure, consisting of steel reinforcement and a travel scaffolding, can be addressed. Apart from the steel reinforcement, the second major intervention was the travel scaffolding designed in order to allow visitors to see the turbine-generator groups more easily and to obtain a museum circulation scheme inside the space (Fig. 4). It is manifested as an intervention that was not original in the building but added later due to the fact that it is completely new in terms of location and function in the space along with the use of different materials in the space such as wood and glass [13].

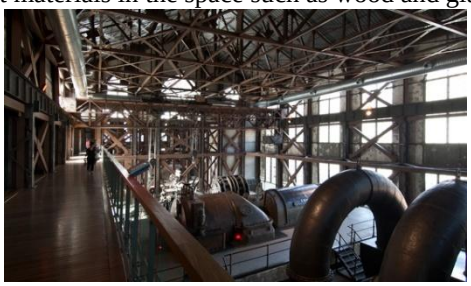

Fig. 4 – Energy Museum [17].

Concerning the structure's flooring, the deep pools found on the ground floors of the engine rooms 1 and 2 when the old and new plans are overlapped, were closed with a returnable metal grid and the level differences within the space were brought under control.

The removal of the walls on the fronts facing the transition section between the engine rooms 1 and 2 and the small rooms located there changed the working layout of the spaces 1 and 2 as separate volumes. Thus, after the intervention, in addition to the integrity effect given by the travel scaffolding, the perception of these two different volumes as a single volume was achieved.

In the new function of the structure unit which has a single-volume space structure and has been refunctionalized as the Faculty of Architecture, open ateliers, jury and exhibition areas have been arranged with open space structure to meet all the functions of the Faculty of Architecture.

The concept of open space was adopted in the interior spaces, thus, the internal volumes were designed to be fluid and transparent. The fact that the atelier, exhibition and jury spaces situated inside the structure, which was functioned as the Faculty of Architecture and library, were the units suitable for the open function supported this setup. However, since the university increased the number of students by fifty percent made the volumes, which could be more transparent, fuller. Despite this, the transparency targeted in the beginning was attempted to achieve by forming interrelated studios at five different levels. This is a significant point in terms of transparency given by the new design against the population increase [14].

A structure whose parts can be disassembled and assembled, taken out and added to another section, even grown (and vice versa) was envisaged. Instead of thinking of the structure in separate masses and then dividing them, the architects designed the structure as a whole. The structure, instead of the masses with different flexibility, consists of a single flexible mass [15].

Spaces approved by the Council of Monuments were designed and applied on the facade of the old structure in accordance with the facade structure and the original identity of the facade in order to get more solar lights.

There have also been several changes on some units after the refunctionalization in the Santral İstanbul project. For example, the info-box structure across the library building is being used as an educational unit today. Similarly, the library and the Contemporary Art Museum structures have been retransformed as academic units in accordance with the university's wishes because the structure was designed as flexible and thus open to new changes [16].

The Santral Istanbul project, in general, gained the campus vitalness needed by rearranging the industrial area, which lost its function and preserving the historical values of the industrial buildings.

It is seen that the area was transformed from electricity generation as a single function in the past into a place that includes various functions such as culture, education, food and beverage and residence nowadays. Moreover, the spaces which contained big machines in the past and were not designed for human use, have today become suitable for the human use.

Rearranging the now-defunct factory complex and preserving the historical values of the factory buildings, Istanbul Bilgi University can be considered as a success in terms of adding cultural and physical values to the region in which it is located.

IV. METHODS

Two different methods were used in the research process. Reading the relevant sources was adopted as the method used to form the theoretical part of the research. As for the latter, collecting documents of the sample structure and examining its technical drawings (site plan, floor plans, section, and detail drawings) were performed to answer the empirical subproblems.

As a sample space, the structure converted from the industrial space in Turkey into university campus was addressed. This structure is Istanbul Bilgi University SantralIstanbul Campus.

What makes the example unique is that the old industrial space, which was about to reach the end of its lifespan, was renewed in a way that would transform the meaning of urban and architecture and exalt the value of the urban environment, that is to say, they were not limited to the idea of transformation on a building scale.

The collection of documents, identification of qualities, determination of their place and location in the city, photography and observation were carried out for the selected sample.

Historical method, archive research and literature review were employed when researching the subject. By scanning theses, articles, journals, seminars, and papers related to the subject, the previous research and evaluation studies were analyzed. The photos of the structures whose problem area completed its functional transformation were found in the archives and used to support the ideas suggested. As a result, this structure that completed its transformation process has issues considered as positive and negative within the context of refunctionalization.

V. CONCLUSION

The concept of refunctionalization is not just a reassessment. It is a transformation process that brings back the registered structures to life. In the light of the entire research, analysis and findings obtained within this study, the reuse of the structures worth preserving in line with the changing needs by refunctionalization testifies to their sustainability over time.

A flexible structure model ensures that the structure can be used by adapting or converting without demolishing as long as its technical life allows. Thus the energy usage resulting from the construction of new buildings and the demolition of existing buildings can be averted. The integrative flexible structure model enables the artificial environment to be transformed in order to reduce the environmental impacts of development. By protecting the environment and natural resources, it contributes to sustainability.

As seen in the example, the industrial structure providing a total space enable more spatially flexible spaces that can be repeatedly transformed and whose function range is more comprehensive than other historical structures to be born.

In the interventions carried out in the horizontal and vertical plane, the industrial heritage structures, which lost their function, allow the designer ease of movement during the architectural design as well as due to their architectural features, such as large space and high ceiling. It has also been observed that these features in question also make it possible to strengthen the carrier system, add the new floors, preserve the original material and facilitate the use of the modern construction systems and materials. These structural properties along with the occupancy of space for the area in which they are located offer various opportunities in the stage of architectural design. It appears that they enable the arrangement of spaces of different sizes needed in the horizontal and vertical planes. When it comes to the new interventions, they facilitate the differentiation of the structure from its authentic constitution.

The importance of preserving the industrial areas that witnessed a period by functioning them as a university campus has been emphasized on a structure and city scale. Its positive contributions to the prevention of memory loss by maintaining sustainability in social, cultural and historical terms have also been presented in the study.

When the university campus mentioned in the study was analyzed, it appeared remarkable with the potential to adapt to developments and changes such as the building mass, spatial organization and furniture arrangement that can be taken place within the process.

It has been identified that the structure was primarily intended to be transformed and apart from the spaces used for educational purposes, the spaces for cultural and artistic activities were established. The campus has historical structures that were functioned to be open to public visits. The main power plant located inside the SantralIstanbul Campus of Bilgi University was converted into Energy Museum.

The museum structures and areas on this campus area are not isolated from public use. The fact that this industrial area in the city is not just a university but also buildings that are open to public use has been perceived as positive.

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