RECENT J. (2025), 77:207-211
https://doi.org/10.31926/RECENT.2025.77.207

Improvement of Urban Life and Environmental Quality in the Reuse of Historical Industrial Area: Izmit Çuha Factory

Semanur KOÇAK
Kocaeli University, Türkiye, kcksemanur@gmail.com
Nevnihal ERDOĞAN
Kocaeli University, Türkiye, nevtrakya@gmail.com

Abstract
Today, many historical buildings have lost their original function and become unusable. The re-functionalization of these buildings not only ensures their physical preservation but also contributes to urban life by extending their lifespan. Industrial heritage buildings, which have an important place among historical buildings, have become redundant and are often abandoned to their fate due to technological, economic, and social transformations over time. However, these buildings not only shed light on the history of production, but also serve as important documents reflecting the socio-cultural, economic, and architectural characteristics of the period. With their large interior spaces, wide openings, and industrial architectural characteristics, these buildings should be integrated into the city with new functions and brought into public life. Within the scope of this study, İzmit Çuha factory is discussed, which is located in Kartepe district, of Kocaeli and is one of the important examples of industrial heritage in Türkiye. The approach will examine re-functionalizing the building in line with its original architectural features, integrating it into the city, and increasing the quality of the environment.

Keywords
Izmit, Çuha factory, industrial historic building, repurposing, urban life and environmental quality

1. Introduction

Buildings are shaped according to the wishes and needs of society and period. With the development of technology, buildings become increasingly inadequate for societies experiencing cultural and social change over time, leading them to become idle. However, among these buildings, industrial buildings occupy a unique place in society's memory compared to other building typologies. Industrial buildings that have lost their function over time are transformed by reintroducing them to the city in order to honor the history and culture of the society. In this context, the Çuha Factory, which is a historical industrial building, will be examined and suggestions will be made to integrate its current status with the city.

Çuha factory is located in the Kartepe district of Kocaeli. The factory, which began construction in 1843 and was completed in 1844, to meet the clothing needs of the military and the local population, was built by order of Sultan Abdülmecid [1]. The woolen weaving factory, designed by the British engineer Sir William Fairbairn, has an important place both technically and architecturally with innovations in the construction and production technology of the period [2].

The factory structure, which actively served the public until the First World War, was closed on July 1, 1920, due to the fire that broke out as a result of the bombing of the Çuha factory by the British. Today, the Çuha Factory area and the standing parts of the factory are located within the military zone [1].

Following the decision dated June 25, 1998, No. 4861, the surviving structures of the Çuha Factory were registered and taken under protection by the Conservation Board of Cultural and Natural Assets No. II of Istanbul, Ministry of Culture and Tourism [3].

2. Çuha Factory Buildings

The buildings of the Çuha Factory, Figure 1, are located in the western part of the military area. The Çuha Factory consists of sections such as Weaving House, Dyeing House, Bending House, Chimney Warehouse, Dehliz, Stables, Hydroelectric Power Plant, Bedesten, Library, and Guest House [1].

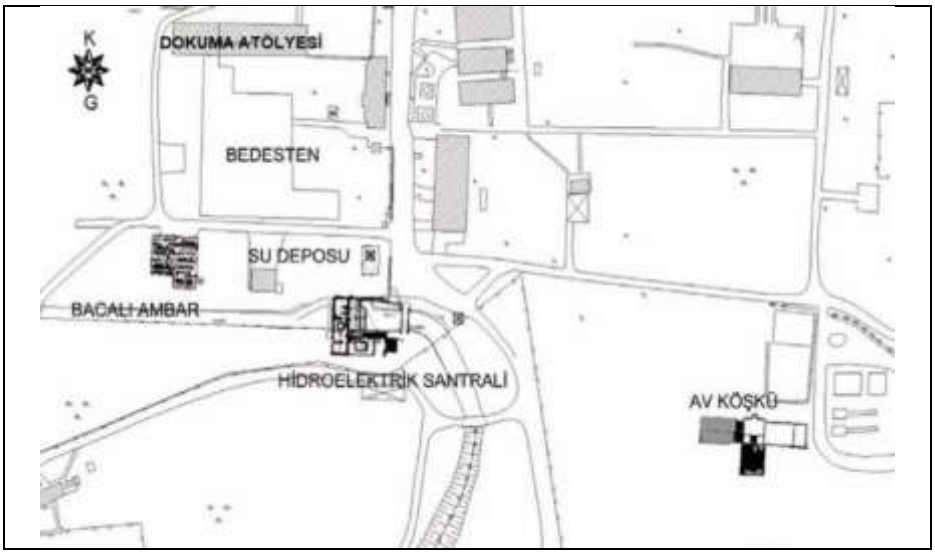

Fig. 1. Site plan of the Çuha factory buildings [4]

2.1. Plan Features

2.1.1. Bedesten

It is thought to have been built in the 16th century with a rectangular plan scheme, Figure 1, that various interventions were integrated into the factory in the 19th century. Located within the Çuha factory, this building is the main production building where the weaving machines of the factory are located [2]. The building with a rectangular floor plan is approximately 89 m long and 44 m wide. The water wheel, located in a separate space adjacent to the building, Figure 3, was built to ensure the operation of the machines. The floor of this building is supported by brick piers connected by arches. The windows and doors of the building built in a masonry system are arched. Today, surface losses and vegetation are observed on the facade of the bedesten building.

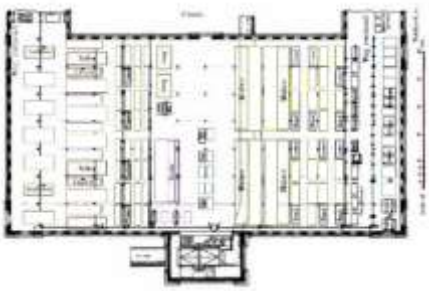

Fig. 2. Partial plan of Izmit woolen weaving factory [2]

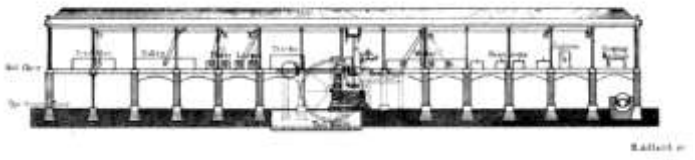

Fig. 3. Section of Izmit woolen weaving mill [2]

2.1.2. Weaving Workshop

The weaving workshop, located to the north of the main production section of the Çuha factory building, is single-storey and consists of four sections. Each section of the building sits on a different level and has different entrances. All sections except one have entrances from the interior. The roof of the building, which was built as a wooden roof, has collapsed today. The building with arched doors and windows on the facade was built with a masonry system. On the facade, there are iron parts belonging to the weaving workshop. Today, most of the building is damaged. Some of the sections were lost during the attack, and the roof and walls collapsed in places, Figure 4.

2.1.3. Hunting lodge

The Hunting Lodge building, which was built to be used as a stable and groom's shelter within the Çuha factory building, has an area of approximately 1250 m^2. The building has a "T" plan, Figures 5 and

6. The middle part is two-story, and the sides are single-story. The main entrance of the building is located at the center of the north facade, and the main units are located here [1]. There are stables and service rooms in the wings on both sides of the entrance. Today the roof of the upper floor has collapsed. The roof of the brick building is of wooden construction. The facade of the building is plastered; the doors and windows are arched and there are jambs around them. Today, it is seen that plants cover the façade, including the areas once considered lost.

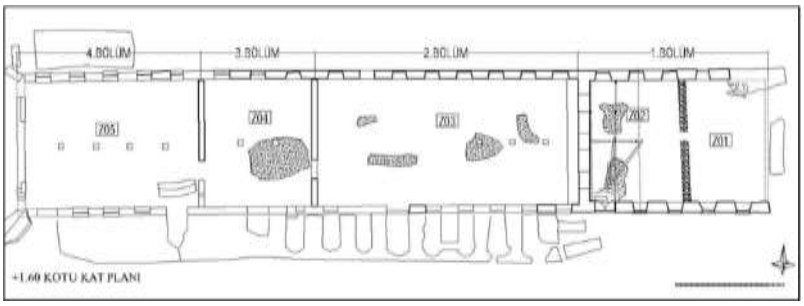

Fig. 4. Survey plan of the weaving workshop [5].

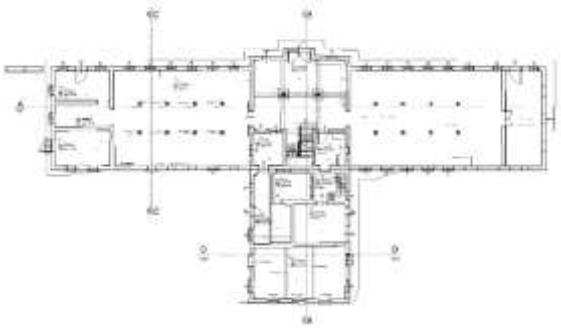

Fig. 5. Ground floor survey plan [6]

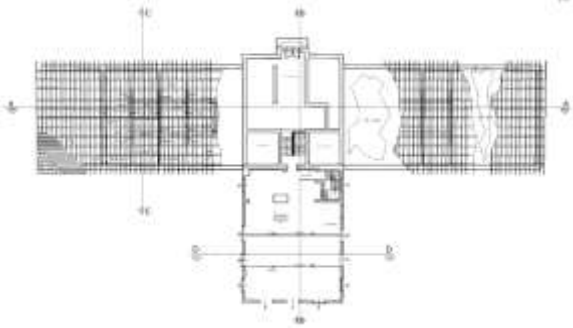

Fig. 6. First floor survey plan [6]

2.1.4. Vented warehouse

The warehouse with a chimney, Figure 7, within the factory structure, is approximately 441m^2. The building has a rectangular plan and consists of two sections. One of the sections is a space with a chimney that is not accessed from inside. There is a toilet in the other section.

Fig. 7. Survey plan of the chimney barn [4]

The space with a chimney is approximately 248.5 m^2 and the other space is 193 m^2. The entrance to the warehouse is located on the north facade. The height is approximately 7.5 meters. In the building whose walls were built with a masonry system, one of the spaces has arched windows, while the other had its windows transformed into a square one during the repair. The base of the chimney between the two spaces is polygonal, and the upper part is cylindrical. The covering system of the building consists of reinforced concrete in a hipped form [1]. The entire facade of the building is plastered, and there are spills on the surface and corrosion on the reinforcements in the affected areas. In addition, the growth of vegetation is observed on the facade over time.

3. Protection Methods and Recommendations

Kocaeli Çuha factory, one of the first industrial buildings of the Ottoman Empire, has not received any holistic and comprehensive conservation practice over time. However, the structures within the factory have partially lost their authenticity. Within the scope of international conservation laws and principles, survey and restitution studies of the building, as well as intervention proposals were conducted to preserve the original parts and details of the building in situ and to make this protection sustainable [7].

3.1. Consolidation

Firstly, the factory buildings' foundations should be excavated and reinforced according to their condition. It is necessary to reinforce the elements that act as carriers.

3.2. Reconstruction

It may be recommended to reconstruct the damaged or lost parts of the buildings and their roofs using the original materials and forms.

3.3. Integration

The worn-out and destroyed parts of the buildings should be reassembled and completed using original materials.

3.4. Cleaning

Vegetation, mossing, and blackening on the upper cover, primarily on the facades, wall surfaces in the interiors, flooring, should be cleaned with appropriate methods and removed from the building.

4. Conclusions and Recommendations

With its historical identity and vast physical potential, the Çuha factory campus is not only a collection of buildings, but also a space that holds an important place in urban memory. In this context, the re-functioning process should be based on the preservation of industrial heritage and its transformation to meet contemporary urban needs. In the first stage, recreational arrangements, such as green areas, walking paths, restaurants and cafes, thematic gardens, picnic areas, art trails, children's playgrounds, etc., it can encourage both social interaction and public participation in open spaces to meet the needs of Kartepe and its nearby districts. In the second stage, the main production buildings of the factory can be transformed into halls that will host culture and arts events. Theatre, concerts, exhibitions, and workshops can be organized there. In addition, an "Urban Memory Center" can be established to archive and exhibit the historical transformation process of Izmit. The educational capacity of the space can be increased with structures such as textile workshops for children and young people that reflect the factory spirit.

In this context, the preservation and adaptive reuse of an existing building offers a more sustainable approach in many respects than the construction of a new building. The utilization of the existing building contributes to the preservation of the surrounding fabric and the continuity of urban memory. In addition, the improvement and re-functioning of the existing building prevents the significant carbon emissions that would occur during the construction of a new building. Considering that the construction sector is responsible for a significant portion of carbon emissions worldwide, preserving and transforming the existing stock is of great importance for environmental sustainability. Such practices

contribute to improving environmental quality, reducing the use of natural resources, and shrinking the ecological footprint of cities. In addition, preserving a historic building enriches urban aesthetics, strengthens the sense of social belonging and enables the transfer of cultural values to new generations.

References

1. Karavar H. (2006): *Osmanlı'dan Cumhuriyet'e İzmit Çuha Fabrikası, 1844-1920* (*Izmit Wool Factory from the Ottoman Empire to the Republic, 1844-1920*). Kocaeli Büyükşehir Belediyesi (Kocaeli Metropolitan Municipality), ISBN 978-9944528764, pp. 35-78 (in Turkish)
2. Fairbairn W. (2014): *Treatise on Mills and Millwork*. Part 1: *On the principles of mechanism and on prime movers*. (First published in 1861). Cambridge University Press, ISBN 9781108070010
3. Aksoy T. (2015): *Kocaeli Kültür Envanteri* (*Kocaeli Culture Inventory*). Kocaeli Büyüksehir Belediyesi Kültür Yayinlari (Kocaeli Metropolitan Municipality Culture Publications), ISBN 978-6058857445
4. Kahraman G., Boduroğlu B. (2017): *Kartepe Çuhane Structures Survey, Restitution and Restoration Projects*. Kartepe Municipality, Survey and Project Directorate, 2017
   see also (reference added by the editor) Kahraman G., Boduroğlu B. (2023): *Kocaeli Kartepe Çuha Fabrikası Av Köşkü'nün Yapısal Analiz ve Malzeme İstatistiklerine Göre Rekonstrüksiyon Müdahaleleri* (*Reconstruction Interventions According to Structural Analysis and Material Statistics of Kocaeli Kartepe Çuha Factory Hunting Lodge*). İstatistik ve Uygulamalı Bilimler Dergisi (Journal of Statistics and Applied Sciences), ISSN 2718-0999, Vol. 7, pp. 1-17, https://www.researchgate.net/publication/373302174_Reconstruction_Interventions_of_Kocaeli_Kartepe_Cuha_Factory_Hunting_Mansion_According_to_Structural_Analysis_and_Material_Statistics
5. Ekinci M. (2013): *İzmit Çuha Fabrikası Dokuma Atölyesi'nin (1 nolu) Restorasyon Projesi* (*Izmit Çuha Factory Weaving Workshop's (No. 1) Restoration Project*). Master's Thesis, no. 346347, Gebze Yüksek Teknoloji Enstitüsü (Gebze Institute of Technology), Faculty of Architecture, Gebze, Kokaeli, Türkiye (in Turkish)
6. Kaşikara A.H. (2013): *İzmit Çuhane Tavla Yapısının Restorasyon Projesi* (*Restoration Project of Izmit Çuhane Tavla Structure*). Master's Thesis, no. 341409, Gebze Technology Institute of Engineering and Science, Gebze, Kokaeli, Türkiye (in Turkish)
7. Fairbairn W. (1865): *Treatise on mills and millwork*. Part 2 (2nd ed.). *On machinery of transmission and the construction and arrangement of mills*. London, Longmans, Green, and Co., https://books.google.ro/books?id=R8wOAAAAYAAJ&printsec=frontcover&hl=ro&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (Cambridge University Press, eISBN 978-1107256682, 2014, https://doi.org/10.1017/CBO9781107256682)

Paper presented at The 17th International Conference
"STANDARDIZATION, PROTYPES and QUALITY: A means of Balkan Countries' collaboration"