

Iranian Industrial Heritage: Adaptive Re-use of the Rayy Cement Factory

İlke Ciritci*

Istanbul Gelisim University

iciritci@gelisim.edu.tr

ORCID No: 0000-0002-1492-0727

Samin Shadnia²

Istanbul Gelisim University

samin.shadnia@ogr.gelisim.edu.tr

ORCID No:0009-0003-3432-5874

Submission Date: 23.08.2024 / Acceptance Date: 10.10.2024

ABSTRACT

Iran has many cultural artifacts from antiquity to the present day. As a result of developments in recent centuries, there are valuable artifacts from Iran's industrialization period that have been preserved and brought back to life through re-functioning. Important for the preservation of Iran's industrial heritage. The preservation of industrial heritage is a topic that has gained importance in recent decades, as it represents the intellectual development and various achievements of human societies. This study aims to discuss the solutions to the disuse of the building, whose original function was a cement factory located in the city of Rayy, as a result of its failure to find a suitable use for its original purpose. The preservation of the building in question will not only add value to the city, but will also strengthen the belonging of the citizens to the city they live in as a building community in the memory of the city.

KEYWORDS

Industrial Heritage, Adaptive Re-use, Conservation, Rayy Cement Factory, Re-functioning.

INTRODUCTION

The entry of industry into Iran in the modern period started during the Qajar period and reached its peak during the Pahlavi period. The new industrial buildings in the country are important documents of Iran's industrial history and architectural developments and should be preserved. Today, these industrial complexes offer suitable spatial possibilities for the creation of needed new uses.

Before the Pahlavi Period, there are no buildings that can serve as an example of industrial buildings. Therefore, the emergence of industrial buildings as an architectural language in Iran coincides with this period. In the function of factories, buildings were constructed in more than one group of buildings in the same forms and in a practical architectural language. These buildings were designed and constructed to house modern, technical equipment and production lines, and the main characteristic of these buildings is how they respond to industrial activities. The form of the buildings is a pure representation of function. Due to Reza Khan's great interest in German order and technology, the factories of this period were often built under the supervision of German architects and engineers. For these buildings, German engineers and masters of traditional Iranian architecture collaborated to create a style of industrial architecture with local characteristics that differed in shape and volume from the examples around the world. The details and ornamentation are characteristic of Iranian architecture. During the 61-year reign of Reza Shah, Iran reached a significant level of industrialization, with more than 270 factories established (Faizi, 2013). Many of these factories are still standing today and have survived the devastation. The factories are important documents of industrial history and Iranian architectural developments that should be preserved.

* Corresponding author.

Industrial facilities that were located outside or the periphery of cities at the time of their construction, are now part of the city. Following the rapid growth of Iranian cities, especially after 2002, and the phenomenon of rapid urban development, the land on which they were built has been incorporated into today's cities, and they cover large areas of land, given their use at the time of their construction. Some of the industrial buildings are now abandoned and idle. Some of the incidents that have taken place on these unstable landscapes have created a favorable environment for crime to take place and spread. Dangerous and inappropriate areas where citizens are afraid to enter have been created around the lands where the communities of idle buildings are located, and these areas have not benefited from progress and development, but have also hindered the development of their surroundings. This study aims to investigate the re-functioning of the Cement Factory building, located in the city of Rayy, which belongs to the first Pahlavi period of Iran, after its decommissioning and the importance of re-functioning decisions (Figure 1).

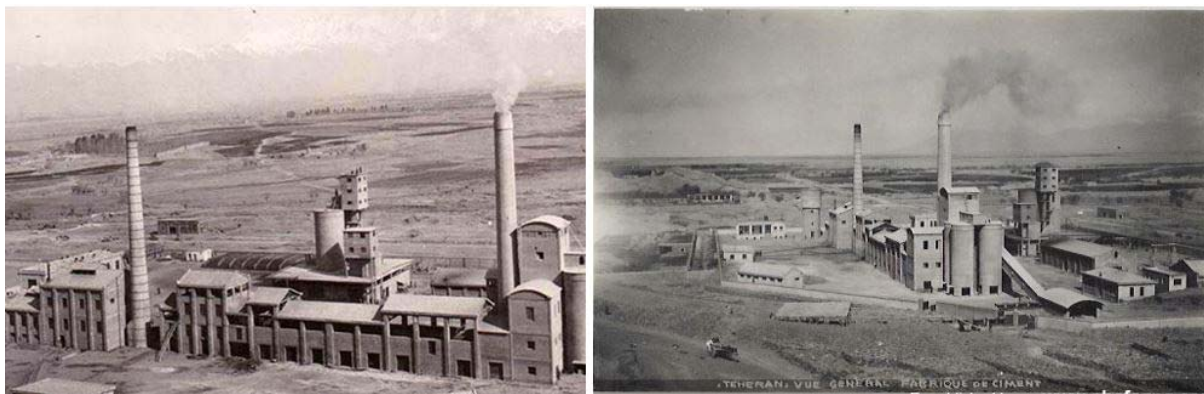


Figure 1. *Rayy Cement Factory, 1933 (left; Amir Bani Masoud archive-URL-1, right; Shafaqna News archive-URL-2).*

In the study prepared within the scope of the Industrial Heritage and Architecture course within the scope of Istanbul Gelisim University Graduate Education Institute' Department of Architecture, the reasons for choosing Rayy Cement Factory as the research subject on the re-functioning of Industrial Buildings are listed below.

- Rayy is one of the most important cities in Iran, with valuable historical monuments from different historical periods (especially Parthian).
- The factories built in the city of Rayy during the first Pahlavi period have not been sufficiently studied in the literature.
- In this ensemble of buildings, where European and Iranian architects and builders worked together, a kind of interaction of modern and traditional architecture can be seen. This interaction is site-specific. The buildings are neither exact examples of Iranian traditional architecture nor of European industrial buildings. Therefore, it is important to unearth and document their details in order to understand Iran's architectural development.
- They represent the period of the arrival of modern industry in Iran and should be considered as unique documents of the country's industrialization. Representatively, the Rayy Cement Factory is one of the least damaged and has lost the least of its original architectural qualities among the examples of Iranian Industrial Heritage. There are also many demolished buildings within the complex and it is important to make it visible and open it up for discussion in order to preserve it.

INDUSTRIAL HERITAGE

The steps towards the protection of industrial heritage and all the tangible and intangible components that make up industrial heritage are dated to recent periods within the general history of conservation. As a result of the increased interest and sensitivity in recent decades, TICCIH has taken on a very important task. With their own words the aim is; *'The delegates assembled for the 2003 TICCIH Congress in Russia wish therefore to assert that the buildings and structures built for industrial activities, the processes and tools used within them and the towns and landscapes in which they are located, along with all their other tangible and intangible manifestations, are of fundamental importance'* (Nizhny Tagil Charter, 2003). So all these components should be studied, their history should be taught, their meaning and significance should be probed and made clear for everyone, and the most significant and characteristic examples should be identified, protected and maintained.

Over two centuries of industrialization, which shaped a significant part of human history, has left a significant legacy for architecture. The organizations ICOMOS (International Council on Monuments and Sites) and TICCIH (The International Committee for the Conservation of Industrial Heritage) published first the Nizhny Tagil Charter and then the Dublin Principles to define the scope of interventions for the adaptive reuse of industrial heritage buildings. The Charter ranks higher than the principles in the hierarchy of norms in the law. Due to its legal superiority, the conservation parameters are based on the Nizhny Tagil Charter and include "sites and monuments, landscape and transportation, facade design, plan scheme, color scheme, structure and materials, sociocultural values, interior equipment and machinery" (Beşir, Karakök, 2023). ICOMOS and TICCIH defined Industrial Heritage in the Dublin Principles in 2011 as follows (ICOMOS,2011; URL-3);

Industrial heritage consists of sites, structures, complexes, areas and landscapes, as well as their associated machinery, objects or documents that provide data on former or ongoing industrial processes, the extraction of raw materials and their transformation into products, and the associated energy and transportation infrastructures. Industrial heritage reflects the deep connection between the cultural and natural environment, as industrial processes, old or new, depend on natural resources, energy and transportation networks that provide raw materials to produce and distribute products to wider markets. It encompasses both movable and immovable assets, but also has intangible dimensions related to technical know-how, the organization of work and workers, and the complex social and cultural heritage that shapes the life of communities and brings about major changes of order to societies and the world at large.

According to the 2011 Dublin Principles, industrial heritage and its protection is not only limited to buildings but also to the process itself. It includes both tangible and intangible heritage. Adaptive reuse has been successfully applied in many types of facilities. Generally, more popular adaptations are museums, art studios, live-work spaces, restaurants, offices, residential units and schools. It is possible to see examples of adaptive reuse of industrial buildings in many different locations across the globe. These buildings are culturally significant and represent different faces of cities as living witnesses of the production culture in those cities (Alpler, Şahin ve Dağlı, 2020). For the sake of future generations, industrial heritage should be recognized, its authenticity should be maintained and repaired, and if it is not possible to continue the same function, it should be brought back to life by giving it an appropriate function. For this, it is very important to document it correctly and give it a function. Each function given should aim to add a new layer of value to the existing value of the industrial heritage and ensure the continuity of the building's existence in the world. The International Committee for the Conservation of the Industrial Heritage (TICCIH) states the aim of adaptive reuse of industrial heritage as the protection of buildings from becoming old and unusable and preventing their possible collapse.

Industrial heritage has a social value that provides an important sense of identity, scientific and technological value in the history of construction, manufacturing, engineering and has a considerable aesthetic value for the quality of its design, architecture and planning (TICCIH, 2024).

Industrial heritages are evaluated in two categories: site areas and the main production building, which serves as the center of the production chain. The parameters for the site were determined as

- sites and monuments,
- landscape and transportation,
- facade design,
- plan chart,
- color scheme,
- structure and material,
- sociocultural values.
- The parameters for the main production building were determined as
 - plan chart,
 - structure and material,
 - facade design,
 - interior equipment and
 - machineries (Beşir, Karakök, 2023).

RAYY CEMENT FACTORY

Industrial heritage sites which were located on the edge of the cities in their time, now with great expansions experienced in most of the urban areas, these sites are no longer outlying locations but a great opportunity to turn into cultural or educational centres due to their facilities and wide open spaces (Daneshmand, 2023). Located 8 km. south-southeast of Tehran, the capital of Iran, Rayy is a settlement as old as Nineveh and Babylon. Excavations have revealed that the city has a very old history. Before Islam, Rayy, which was under the rule of states such as the Medes, the Rabinish, the Seleucids, the Parthians and the Sassanids, had a very large area. According to the Greek geographer Isidorus of Charax, who lived in the first century AD, the city of Rayy was larger than all Median cities. In addition, the city had a good climate and weather. Therefore, Rey was chosen as the summer capital during the Parthian period (247 BC-AD 224) (Aylar and Hassani, 2021). It is considered one of the most important cities of the early Islamic period in terms of its size. It is considered the most powerful city after Baghdad and Nishapur.

Looking at the internal structure of Rayy, the first part of the city was Upper Rayy, which was built before Islam. The second part was Lower Rayy, which was built south of Upper Rayy, south of Mount Bībī Shahrībānū. Upper Rayy lost all its splendor to Lower Rayy during the Islamic period. Caliph Mahdī's construction of the Muhammadiyya in 775 was one of the turning points for Rayy in terms of architecture. Mahdī surrounded the city with moats and built a large mosque in the city. Rayy was then divided into two parts by surrounding it with low walls. The people called the part inside the wall the Inner City and the part outside the wall the Outer City. However, Muhammadiyya was basically divided into three parts called Shahrīstan, Kale and Rabaz or Bazaar (Aylar and Hassani, 2021) (Figure 2).



Figure 2. *Internal Structure of the City of Rayy in the Islamic Period (Kerimân 1345, s. 23; Aylar and Hassani, 2021).*

Ten industrial buildings dating from 1859 to 1940 remain in Tehran (Pouryan, 2017). Rayy Cement Factory is the best of these structures (Figure 3). In 1930, a contract was signed with the Danish company FL Schmit for its construction, and on January 3, 1933, Iran's first cement factory was officially opened. After 48 years of production, the factory was closed in early 1981.



Figure 3. *Google earth data of the factory building site - left 1981, right 2016. (Shahrari Governorate, 2023).*

Built on 87,358 m² of land, the cement factory has three construction phases, with each phase increasing the capacity of the factory. Most of the functional areas were built in the period from 1930 to 1938, including the central part of the complex. This part consists of 15 different spaces, eight of which are used as warehouses and the others are related to cement production. The factory and the cement mine were adjacent and therefore institutionally linked (Pouryan, 2017). Part of the factory area was set aside for workers' and staff housing, but according to aerial photographs, this did not take place until 1960.

The plan of the cement factory parallels the production process; in fact, in the first phase, only the walls around the machinery and the roof were built. A photograph taken by Frederick Clapp shows the

construction of the factory in 1933 (Figure 4). Unfortunately, due to the lack of machinery, there is no evidence to confirm the actual function of the spaces. However, due to the sequential production process, it is possible to identify a relative spatial organization.



Figure 4. Photograph taken by Frederick Clapp in 1933 (Pouryan, 2017).

Pouryan prepared a schematic plan for his study (Figure 5). The southeastern part of the complex is relatively more compact than the other parts. This part is the closest to the cement mine, and the first stages of cement production (crushing, pre-homogenization, grinding, preheating and rotation) were carried out in this part. It is estimated that most of the production process was carried out in this part (Pouryan, 2017).

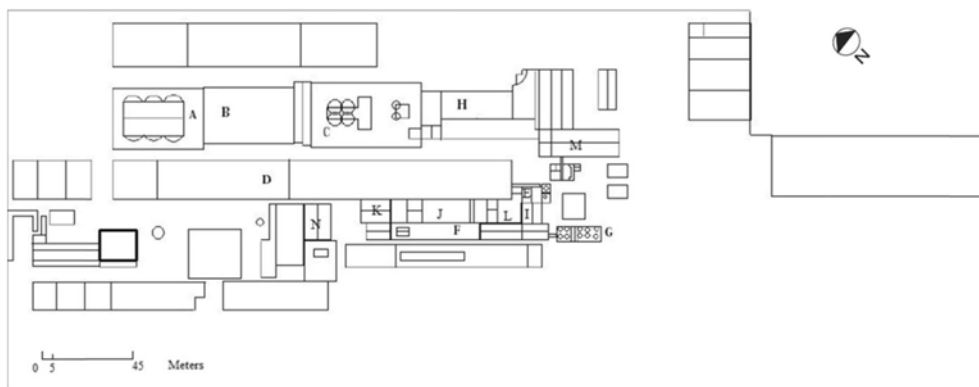


Figure 5. Sketch plan of the Rey cement factory: A and C: cement silos; B: cement mill; D: clinker storage; E, I and L: raw material mill of the 1930s kiln; F: Raw material mill of the 1936s kiln; G: cement ore silo; H: machine repair workshop; J: rotary kiln; N: electric generator (Pouryan, 2017).




The Rayy cement factory is one of the most important examples of industrialization in Tehran. This is because of the role the cement factory played in the transformation of the surrounding built area and social fabric during the 50 years it operated in a small part of Rayy. As can be seen from the photographs, work at the factory began when very few people still lived in the area (Figure 4). By 1983, the last year of the factory's operation, Rayy had become one of Tehran's largest satellite cities (Pouryan, 2017). The factory was not the sole reason for this development, but it would not be wrong to say that the cement factory played an important role in the shaping process of the newly populated city. It served as a center of attraction for the labor force and now as a monument to the new identity of modern Rayy.

The construction phases of Rey Cement plant are divided into three periods;

- first period 1930-1933
- second period 1933-1942
- third period after 1942 (Pouryan, 2017).




In the first period the main buildings of the complex, including the 100-ton line, were built. These included repair shop, foundry, attic hall, Asian raw material line, cement storage silos, filling machine, warehouse closed hall, turbine wooden hall, raw material crusher, Asian raw materials and kiln line. (Table 1).

Table 1. First Period (1930-1933).

	<p>First Period: 1930 – 1933</p>
	 <p>Definition: During this period, the main buildings of the complex, including 1 line (100 ton line) were constructed and put into operations:</p> <p>Repair shop, Foundry, Rooftop hall, Asian raw material line.</p> <p>Cement storage silos, filling machine, Warehouse indoor hall</p> <p>Turbine wood hall raw material crusher, Asian raw materials and kiln line.</p>



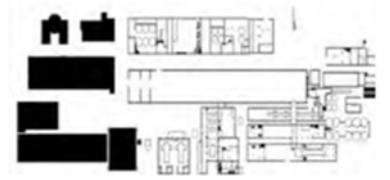
In the second period, new sections including a 200-ton line were added to the main buildings (Pouryan, 2017). These sections are open hall, warehouse, raw material facilities of the 2nd line, cement storage silos, mazor, electrical room, compressor hall, water supply drying tower (Table 2).

Table 2. Second Period (1933-1942).

	<p>Second Period: 1933 - 1942</p>
	 <p>Definition: During this period, new sections including a collection line (200 tons line) were added to the main buildings. These sections are:</p> <p>Open hall, Warehouse, Raw material facilities of the 2nd line.</p> <p>Cement storage silos, Diesel, Electricity room.</p> <p>Compressor hall, water supply drying tower.</p>

In the third period, a third line of 300 tons was added to the factory (Pouryan, 2017). This line includes cement storage silos, office building, archive, warehouse, laboratories, locker room, canteen, assembly hall, cement pumping and modeling (Table 3).

Table 3. Third Period (After 1942).

	<p>Third Period: After 1942</p>
	 <p>Definition: During this period, the factory's 3rd line (300 ton line) was added.</p> <p>Cement storage silos, Office buildings, Archive. Laboratories, Changing room, Canteen, Assembly hall. General warehouse, Cement pumping and Modelling.</p>

In the 1968 aerial photograph, compared to the 1933 photograph, it is seen that the city has developed towards the factory and buildings have been constructed around it. While the factory building was once located in a desolate and uninhabited area of the city, the city developed towards the factory and the factory brought vitality to the city (Figure 6).



Figure 6. 1968 Aerial Photograph (URL-4).

After the closure of the facility, the Tehran City Council decided to preserve and restore the building ensemble due to its industrial and cultural value. As a result of the agreements, due to the lack of cultural space in this area, it was deemed appropriate to re-function the facility as a cultural building and the name of the building ensemble was changed to Safaiyeh Cultural Center.

Considering its current use, the facility is divided into 3 sections (Figure 7):

- There is a section containing laboratories and allocated to Azad University.
- The plaster and soil warehouse at the eastern end was sold to a lime company.

- The central part was transferred to the authority of the board of directors of the factory, which is in the form of parts with the use of rented warehouses and repair shops.

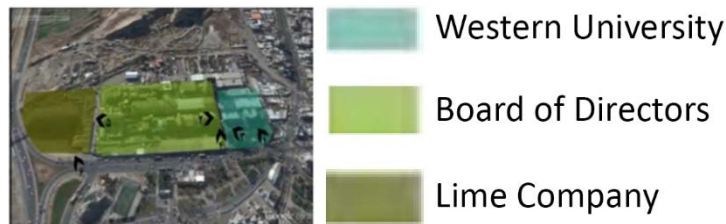


Figure 7. *Analysis of Present Use.*

Rayy Cement Factory is located on a land area of approximately 90,000 square meters on Fedaiyan Islam Street, Pul Ciman Street, Sargerd Mohammadi Street, Safiyeh Square in Shahreri, northeast of Rey and District 20 of Tehran Municipality.

The cement produced at the Rayy Cement factory was “Portland” type cement, which was of high quality and highly sought after. The cement factory produces 11 megawatts and 600 kilowatts of electricity with two diesels and four turbines, while the electricity consumed by the factory was 5 megawatts.

The complex has different buildings of different sizes and dimensions. Due to its history, size and location, Rayy Cement Factory has a high social, cultural and economic capacity to be recreated and repurposed in the city, the region and even the country. The complex is under the responsibility of Tehran Urban Renewal Organization of Tehran Municipality. A remote search for the results of the competition (International Idea Competition for the Adaptive Reuse and Renovation of Rayy Cement Factory- by Tehran Urban Renewal Organization) project on websites that can be accessed outside Iran has not yielded a stable answer. One of the difficulties of studying a building in Iran is that the sources of information that can be accessed on the web in the literature review cannot be opened outside Iran, that is, they are limited. At the same time, the way libraries are managed does not allow for open access. All of these restrictions are understandable given Iran's more insular governance and are the reasons for the lack of resources. The current and more recent visuals of the competition and the on-site implementations could not be accessed, but the findings were compiled from the limited resources available outside Iran.

In 2020, Tehran Urban Renewal Organization invited all interested and qualified national and international groups and companies to participate in the “International Idea Competition for the Adaptive Reuse and Renovation of Rayy Cement Factory”. Many ideas have emerged as a result of the competition. Within the framework of this competition, the participants recognized and observed the values of the Rayy Cement Factory, one of the examples of Iran's industrial heritage, and developed a conservation proposal. In addition to design and planning ideas for the renovation of Rayy Cement Factory, they also presented ideas on the necessary costs, Feasibility Study Report and how to attract investment ([URL-5](#)). The projects participating in the competition can be viewed online through various social media platforms. Since the website of Tehran Urban Renewal was not accessible in our location, it was not possible to review the participating projects on the official website. When the projects participating in the competition through various social media were examined, it was seen that there are designs that do not pay attention to the international basic principles in terms of conservation principles, as well as designs that respect the structure and meticulously address the basic principles that provide current needs.

The Rayy Cement Factory was the first cement factory in the country to have a 100-ton production line, so its main use during the reuse process was as a museum of the cement industry (Pouryan, 2017). A part of it has also been opened as a museum to support employment and knowledge-based activities. Allocated for communal spaces and start-up projects (entrepreneurship). These repurposed areas cover a total area of three hectares and have been handed over to the Tehran Urban Renewal Organization (Figure 8).



Figure 8. Images before renovation (URL-6).

During the re-functionalization process of the facility, the location of the office buildings was one of the important priorities in the layout of the spaces (Figure 9). It is noteworthy that during the renovation of the building, the building components and the machinery related to the original function of the building before the restoration were preserved.

These conservation principles are in line with the Dublin Principles in the 'Joint ICOMOS - TICCIH Principles for the Conservation of Industrial Heritage Sites, Structures, Areas and Landscapes', which was realized in 2011. The principle in Article 8 of Title II is;

In the case of active industrial structures or sites of heritage significance, it must be recognized that their continued use and function might carry some of their heritage significance and provide adequate conditions for their physical and economic sustainability as a living production or extraction facilities. Their specific technical characteristics and features need to be respected while implementing contemporary regulations such as building codes, environmental requirements or risk reduction strategies to address hazards of natural or human origin. (ICOMOS,2011; URL-3).

The office function was assigned to the buildings that were close to the entrance of Safaiye Street due to their location. These buildings also functioned as paper storage buildings. Providing transportation to other buildings is another important point. The entrances of Safaiyah and Sargerd Mohammadi Streets played a decisive role in the functionalization of the buildings.

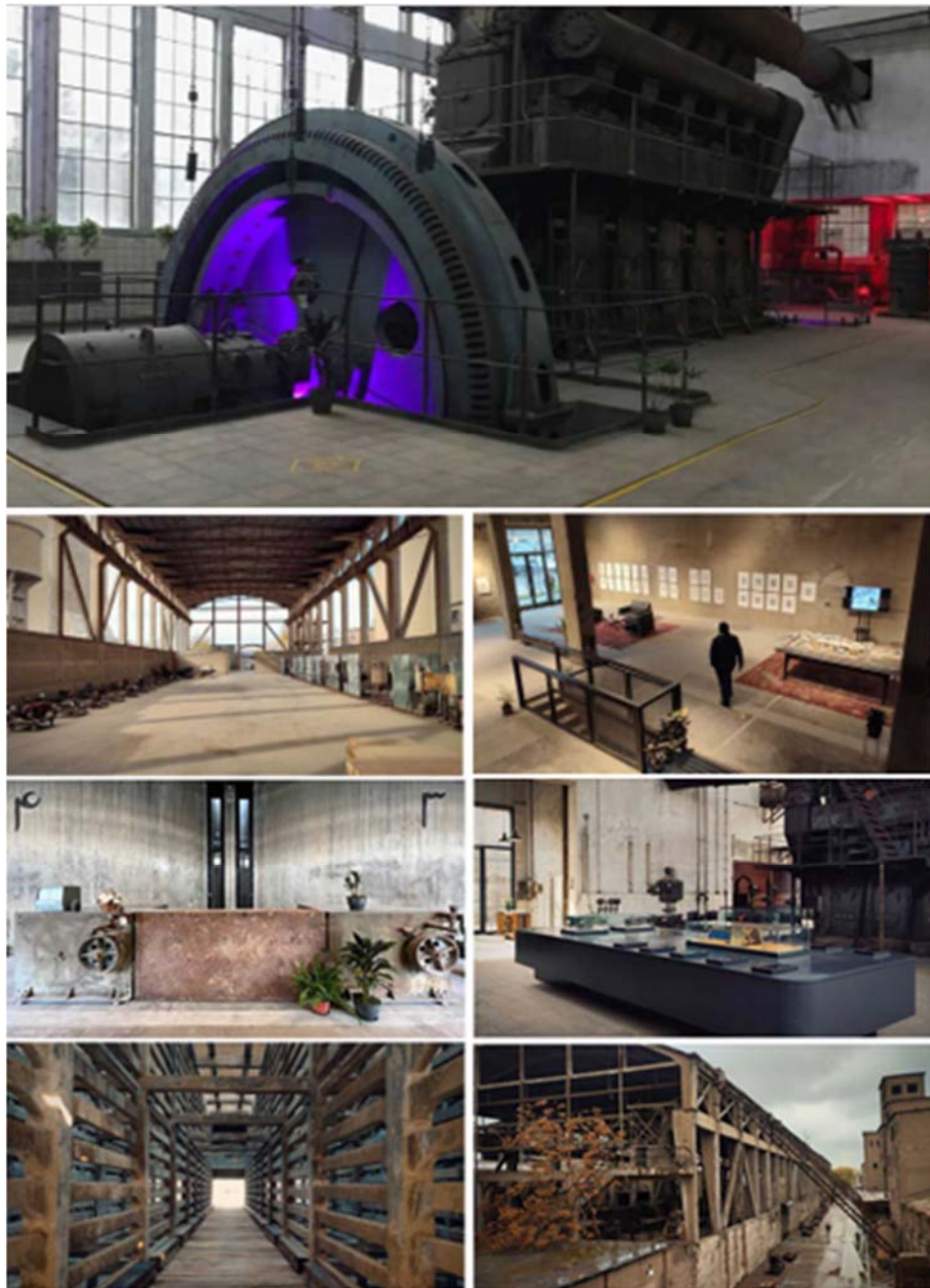


Figure 9. Interior photos from the renovated building (URL-7).

CONCLUSION

Signs of Iran's industrialization process appeared as early as the mid-Qajar period, but accelerated widely during the first Pahlavi era. Ray is one of the most historically important cities in Iran, containing valuable artifacts from different historical periods. The factories built in this city during the early Pahlavi period are representative of the development of modern industry in Iran and unique documents of the country's industrialization. Among the surviving industrial heritage factories in the region, the Cement Factory is one of the factory buildings that has preserved its original character the most, as it has suffered the least destruction. In this respect, bringing it back to life by re-functionalizing it is not only economically efficient but also culturally important for the continuity of the city's memory.

Many industrial heritage buildings are waiting to be brought back to life by giving them the right functions. It is also important to make the issue visible through design idea competitions for the

reuse of industrial buildings and to open it up for discussion in the design environment in order to keep the issue on the agenda and for governments to consider the issue. Local governments or relevant ministries will take the necessary initiatives to transfer industrial buildings, the most important building type of the 20th century, to future generations within the framework of conservation principles and prevent them from disappearing from the memory of the country and the city.

ACKNOWLEDGEMENT

This study is based on the research prepared within the scope of the course titled Industrial Heritage and Conservation at Istanbul Gelisim University Graduate Institute, Department of Architecture.

CONFLICT OF INTEREST

The Authors declare that there is not any conflict of interest about this paper.

BIBLIOGRAPHY

Alpler Z. B., Şahin N. P. Ve Dağlı U.U. (2020). A critical discussion of industrial heritage buildings adaptive re-use as film spaces, case study: industrial heritage buildings at Istanbul, *Journal of Architectural Conservation*, DOI: 10.1080/13556207.2020.1782105.

Aylar M., Hassani A. (2021). Orta Çağ İslâm Coğrafyacılarına Göre Rey Şehrinin Sosyo-Ekonomik Durumu ve Mimari Yapısı, *Türkiyat Mecmuası* 31, 1 (2021): 68-86 DOI: 10.26650/iuturkiyat.901606.

Beşir Ş. E., Karakök M. E., (2023). Determination of Conservation–Reuse Parameters for Industrial Heritage Sustainability and a Decision-Making Model Proposal. *Sustainability* 2023, 15, 67-96. <https://doi.org/10.3390/su15086796>.

Daneshmand P. (2023). History of Adaptive Reuse in Architecture: Studies from Iran. *Akdeniz University Journal of the Faculty of Architecture* 2(2), 138-155.

Faizi R. (2013). Industrial Heritage; a Narrator of Human Life in the Age . *Electronic journal* web site accessed from Iran: <http://sarvestan.ir> at the date 23.08.2024

ICOMOS. (2011). Joint ICOMOS – TICCIH Principles for the Conservation of Industrial Heritage Sites, Structures, Areas and Landscapes; The Dublin Principles, 28 November 2011, 17. *ICOMOS General Assembly*. URL-3.

Kerîmân, Hüseyin. Rey-i Bâstân. I. Tahran: Silsile-i İntişârât-i Encümen-i Âsâr-i Millî, (1345); II. Tahran: Silsile-i İntişârât-i Encümen-i Âsâr-i Millî, (1349).

Nizhny Tagil Charter. (2003). Nizhny Tagil Charter for The Industrial Heritage, The International Committee for the Conservation of the Industrial Heritage (TICCIH), 17 July 2003. <https://ticcih.org/wp-content/uploads/2013/04/NTagilCharter.pdf>

Pouryan, A.A. (2017). History, Space, and Industrialization: An Industrial Archaeology of Labor at Tehran, Iran, *Int J Histor Archaeology* (2017) 21: 708–724, DOI 10.1007/s10761-017-0394-5.

TICCIH, (2024). The International Committee for the Conservation of the Industrial Heritage (TICCIH), <https://ticcih.org>, Access date: 15.08.2024

Shahrari Governorate , (2023), 113133 LiveTabsContent#4223http://portal.ichto.ir/Default.aspx?tabid (can not be accessed out of Iran, access date from Iran: 2023 and 2024)

- URL-1 : Rayy Cement Factory, Amir Bani Masoud archive;
https://www.instagram.com/p/Cg1f7WQOlc/?img_index=1 Access date: 15.08.2024.
- URL-2 : Rayy Cement Factory, Shafaqna News archive; <https://fa.shafaqna.com/media/2017/05/iran47.jpg>
Access date: 15.08.2024.
- URL-3 : ICOMOS – TICCIH, Principles of Dublin, 2011,
https://www.icomos.org/images/DOCUMENTS/Charters/GA2011_ICOMOS_TICCIH_joint_principles_EN_FR_final_20120110.pdf
- URL-4 : 1968 aerial photo, <https://www.emaratkhorshid.com/en/project/adaptive-reuse-rehabilitation-of-rey-cement-factory/> Access date: 15.08.2024.
- URL-5 : Rayy Cement Factory competition news, <https://bustler.net/competitions/7318/international-ideas-competition-for-adaptive-reuse-and-regeneration-of-rey-cement-factory> Access date: 15.08.2024.
- URL-6: Rayy Cement Factory International Design Idea Competition announcement video,
<https://www.facebook.com/ceat.ir/videos/international-ideas-competition-for-adaptive-reuse-and-regeneration-of-rey-cemen/1138812216468913/> Access date: 15.08.2024.
- URL-7: Rayy Cement Factory renovated interior photos, <https://dibats.com/project/architectural-and-engineering/rehabilitation-rey-cement-factory/> Access date: 15.08.2024.