Contemporary Extension Proposal for Adaptive Reuse Industrial Archaeology: Minasın / Minas Mill Example

Abstract
Industrial archeology deals with the pre-industrial, industrial revolution and the periods after this revolution. One of the industrial archeology structures is the mills. The issue of protecting and ensuring the sustainability of mills as rural industrial heritage comes to the agenda quite frequently. However, as is the case with other historical buildings that are in ruins, reintegration work cannot be carried out in mills due to the lack of restitution resources in restoration applications to today's comfort conditions. In such cases, since the building cannot maintain its original function today, a contemporary addition is designed to suit its new function. Within the scope of this study, conservation suggestions were made for the Minasın Mill, which remained idle in Isparta, and a contemporary addition was designed. Firstly, the building's survey was taken, and then modern annexes and building elements were designed in 3D and suggestions were made for its use.

Keywords: Industrial Heritage; Mills; Contemporary Extensions; Conservation; Restoration.

1. Introduction
In order for historical buildings and settlements to be living organisms today, today's comfort conditions and their adaptation to modern life must be ensured. For this reason, innovative and contemporary methods are used in the conservation and restoration process of these structures (Amen, 2021; Amen et al., 2023; Sansen et al., 2021; Ülker et al., 2021; Yilmaz, 2021). One of these is to give new functions to structures that have lost their old functions and turn them into structures that live longer. In particular, industrial buildings that remain idle due to advancing technology and remain in the city center due to the expansion of cities provide invaluable opportunities for socio-cultural structures that are sought for space within the congested urban fabric. With re-functioning, designs that provide spatial comfort with wide openings, high ceilings and large volumes can be made. The subject of industrial archeology is the preservation of unused production systems or areas that have become "historic" because their working technology and principles have changed and their restoration to the city through different methods. Industrial archeology includes not only a single industrial heritage but also built environments, industrial zones, products, mechanical equipment, residences, shops and recreation areas within industrial complexes (Köksal, 2005). Industrial archaeology; It has been defined as "a field that examines all concrete and abstract documents, structures that constitute industrial production, settlement texture and urban landscapes" (TICCH, 2003). The scope of industrial archeology is generally expressed as "evaluation of what we understand from the industrial past, reuse of industrial structures, exhibition of industrial products in museums, operation of preserved railways, production of models for the preservation of structures, studies on the history of technology and economic history." In addition, industrial archeology, "mining; energy sources such as windmills, water wheels and steam engines; manufacturing industries such as textile, pottery, glass, food and beverage making; means of transportation such as roads, bridges, canals and railways; Places that produce building materials such as quarries, brick workshops, sawmills; residences built for industrial workers, managers and factory owners that are part of production and social history; It is seen that "systems created for public services such as gas, water and communication" are examined and fall within this scope (Köksal, 2005). The structures and ruins, which are described as industrial archaeology, are also exhibited as an open-air museum and brought to the city. Many examples of industrial buildings and industrial archeology can be given, while preserving the originality of the building and transforming it with a new function according to the needs of the city in which it is located. The transformation of the Beykoz Leather and Shoe Factory into the Contemporary Art Museum in Turkey is a qualified example. Repurposed buildings such as Tophane-i Amire Culture and Art Center, Rahmi M. Koç Museum, Santral Istanbul (Silaharaga Power Plant), Istanbul Kadir Has University can be given as examples of this (Yiğitoğlu, 2020). Hasanpaşa Gas Works / Museum Gas Works, which was deemed worthy of the "Structure / Preservation Branch Award" at the 2022 National Architecture Awards, is also a good example of the transformation of industrial heritage (Kiraç, 2023). Worldwide, Tate Modern, Centrale Montemartini, Caxia Forum, Distillery District, The Chapel on the Hill - Forest-in-Teesdale (United Kingdom), Jaegersborg Water Tower (Denmark), House of Vans London (United Kingdom), Huini House - La Primavera (Mexico), Residential Building Refurbishment (Italy), Quarry Theater at St Luke's – Bedford (United Kingdom), Wooden Structure at Launchlabs (Switzerland), Church Conversion into a Residence (United States), Refurbishment Viaduct Arches (Switzerland), The " Brain of Brian" Floating Office Barge (United Kingdom), An Old Breton Barn Converted into an Artist Studio (France), Lesczynski Antony Manor Intervention (Poland), The Green Building (United States), Refurbishment of the Old Benalua...
Station and Insertion of There are many industrial buildings that have been repurposed and have contemporary additions, such as Casa Mediterraneo Headquarters (Spain), Professional Cooking School in Ancient Slaughterhouse (Spain), Leszczynski Antony Man Intervention (Poland) (URL 3).

2. Contemporary Annex in Adaptive Reuse

There are situations where physical protection is not enough to protect historical buildings and contemporary conservation methods are used to give them new functions. It may be necessary to introduce various new contemporary additions to the existing texture / structure (Sivil and Dabanlı, 2023). In the conservation and restoration discipline, the issue of "contemporary addition" is addressed in two different ways: at the building and city scale. While new buildings are added according to the needs of the historical texture on the city scale, additional structures etc. are added in line with the needs of the historical building on the single building scale. designs are being considered. Contemporary appendix design has been studied according to different evaluation criteria and classifications in the academic literature and analyzed according to these evaluations (Sivil and Dabanlı, 2023).

In terms of contemporary conservation approaches, annexes should reflect their own period with their style, construction technique and materials, and adapt the existing structure to current needs while also emphasizing its value and importance. However, while raising the standards required by reuse, the existing structure should be respected in terms of originality, integrity and meaning (Binan, 2014). According to the Venice Charter, the contemporary addition must be distinguishable from the existing architectural composition, must bear the stamp of its period, and must not damage the interesting parts of the building, its traditional location, composition, balance and connection with its environment (Erder, 1977). Comprehending the unique qualities, style and language that constitute the meaning and identity of the existing area, and examining and analyzing the environmental data in detail provide important clues that guide the design of the annex. According to the data obtained, the relationships that play a decisive role in the design of the "new" next to the "old" can be summarized with the dimensions of location-environment, mass-ratio and façade-material. While on a large scale, the location of the crop to be built and its relationship with its existing environment come to the fore, on a close scale, the mass and ratio relations between the old and the new constitute critical dimensions. The solid-empty ratio on building surfaces, color, texture, ornamentation and rhythm are other decision dimensions regarding façade and material (Velioğlu, 1992). Adjacent annexes that are physically attached to the existing structure aim to expand the structure to meet new needs, add new spaces or new floors, or protect the structure in the form of a cover. Since adjacent annexes establish a comparable relationship in terms of being in direct physical contact with the facade and roof of the existing building, properties such as mass, material and texture gain importance. Since producing appropriate solutions at the physical contact line of the adjacent annex and the existing structure can often turn into challenging design problems, it should be preferred to keep the contact with the existing structure at a minimum level. Keeping the line of contact limited also allows and contributes to emphasizing the difference between "old and new". One of the important principles that should be taken into consideration in annex design in terms of conservation approaches is that the designed annex reflects its own era. Supplements that do not reflect their era attempt, consciously or unconsciously, to interrupt historical continuity. Contemporary additions, which reflect the period in which they were produced with their materials, construction techniques and forms, are becoming an important component of cultural continuity as genuine solutions developed for real needs (Sivil and Dabanlı, 2023).

According to Zeren (2010), the variety of annexes produced depending on the location and organization of historical buildings is as follows:
- roof attachment
- facade addition
- Transition element between two structures (tube passages as horizontal circulation elements)
- Circulation elements attached to the structure
- Additional as eaves element
- Integrations made to the facade of the building

It is made as a "cover" to cover the cultural assets of contemporary annexes for protection. Protection and conservation roofs seen in archeological areas can be given as examples. Additionally, the additions made to replace the missing roofs of burned or damaged buildings can also be seen as cover additions (Sivil and Dabanlı, 2023). Beyoğlu Municipality Building and British Museum roof additions can be given as examples (Figure 1).
There are certain criteria applied in the design of contemporary additions to historical buildings. According to Zeren (2010), the criteria to be applied in the design of the additional building are as follows;

- **Effect of the Environment:** The location of the region has qualities that will affect the crop material and style.
- **Effect of Scale:** The mass, volume and proportion of the new addition, both horizontally and vertically, should be designed with aesthetic concerns so as not to crush the historical building.
- **Contrast Effect:** The historical building should be highlighted by contrasting it with the historical building to be built in terms of material, color and scale.
- **Effect of Form:** The choice of form of the annex construction is an element that can create mass perception, harmony or contrast with the historical structure, and is important.
- **Rhythm Effect:** A homogeneous architecture or pattern is seen in the texture of historical buildings. When facade and volume designs in this texture are examined, they generally give a perception of rhythm through the repetition of an element or motif. The new addition to be built even supports the rhythmic structure of the historical structure or texture by repeating a ratio or element of the existing structure with a different formation or material.
- **Effect of Material:** Material selection is an important criterion that can be used to emulate or contrast with the historical structure. The material to be applied should generally be contemporary and new, and the historical structure should contrast with the work. However, there are also additions made with local and original materials or materials similar to this material, which emulate the historical structure or texture.

An addition or annex should be approximately the same height as the existing building. The topographic characteristics of the region where the building is located are effective in this regard. The elevation differences of the front and rear facades should be taken into consideration. A contemporary addition higher than the historical structure or texture should not be accepted (Zeren, 2010).

Contemporary supplement applications can be seen in different examples around the world. British Museum, Ljubljana City Museum, Kolumba Museum, Moritzburg Museum Extension, Caixa Forum, Archaeological Ruins of the Abbey Of St. Maurice, Convent de Sant Francesc, National Maritime Museum, Museum de Fundatie, Victoria & Albert Museum, Visitor Center of Cluny Museum can be given as examples. Contemporary suffix examples in Turkey are fewer than the examples in Europe. Esma Sultan Mansion, Santralistanbul Contemporary Arts Museum, Borusan Music and Art House, Kazakhli Caravanserai, Ishak Pasha Palace, TCD D Hangar Buildings, Beyazıt Public Library, Agora Museum House, AGÜ Sümer Campus Fire Station, Boğaziçi University Gözlükule Excavation Research Center, Yapı Kredi Culture Center, Göbeklitepe Revitalization Center, Şerefiye Cistern, Zeugma Ancient City, Antalya Necropolis Area, Museum of Modern Arts are examples of Terkiye (Sağlam and Tavşan, 2019).

### 3. Mill Example as Industrial Archaeology: Mill of Minasin / Minas

Unused and idle industrial structures or areas are examined under the title of "industrial archaeology", and one of these areas is mill buildings. Mills, which are both tangible and intangible cultural heritage; wheat, corn are turned into flour, barley, oats, etc. They are production places that have an important place in the processing of products, and they are industrial heritage structures that work by using power sources such as human, animal, water or wind (Ceylan, 2014). They are examples of cultural heritage with different and unique technical value in terms of both architectural typology and production equipment and layout (Çorapçıoğlu and Binan, 2017). In the mills, in addition to various intangible cultural heritage elements such as millstones, wheels, troughs, boats and the mill building, there are water transmission channels, water tanks, aqueducts and water towers (Çorapçıoğlu 2015; Aykaç 2021). The flow of water in water mills has been evaluated as a potential energy source. Mills powered by water are mechanical systems that operate the millstone and shaft or gear by transmitting the movement of water flowing through the grooves (arcs) to the turbine through water wheels (Çorapçıoğlu and Binan, 2017). Water mills, which were built around water resources in many parts of Anatolia, are on the verge of extinction today, and today the mills have been replaced by factory structures with different types of energy, different technologies and mechanical mechanisms. Water mills located in rural areas are structures that should be considered and evaluated within the scope of industrial
archaeology. These structures are very unique in terms of providing information about the geographical typology they are located in and the agricultural, commercial and socioeconomic situation of the societies they belong to. The mills in Isparta have not been the subject of much academic study. Gökarslan and Köse documented and sketched only the Hüseyin Baş and Bitrak Mills in 2023 (Gökarslan and Köse, 2023). The ruins of the Minas Mill were discovered after this study. It is a mill that is barely mentioned in the sources in the literature and the public has no information about the construction date or usage process of the building.

3.1. History, Location and Architecture of the Building

Only the works of Nuri Katircioğlu and Süleyman Sami Böcüzade were used regarding the structure known as Minas or Mill of Minas. According to Böcüzade, ruins of ancient artifacts were found on Hisar Hill, Öküzbatti locality of Sidre Mountain, Ayazmana and Minasın (formerly known as Minassus) regions. It is known that there are Greeks in the villages of Sav, Lagus, Minas, Agros and İslamköy. British Archaeologist S. W. Ramsay mentioned the existence of historical canals and arches between Minassus and Bayat (Böcüzade, 1983). According to these statements, the Minas region is a very old settlement. The waters coming from the Sıprüncak Plateau of Geyren Village and known as Kral Water (name coming from the King of Minassus) (Böcüzade, 1983) flow to the area known as Minasin and operate two water-powered flour mills in Minasin. These waters merge with the Isparta Stream in winter and pass through the Dere Strait and pour into the Antalya Bay. It is known that one of the mills was purchased by the family known as Hacı Patlak Sons or by Lutfi Sezgin (two different names are mentioned in Katircioğlu’s source), demolished it and replaced it with a new flour factory. With the construction of this factory, the other mill working with traditional millstone (the mill known as Minasın Değirmeni and the subject of this study) remained idle (Katircioğlu, 1958).

The building ruins known as Minas or Minas Mill is located on 230th Street, in the eastern part of Isparta’s Gülcü District. Minasın Değirmeni is located on sheet no. 106, island no. 93, parcel no. 2. The pond reached by the Darı Stream, which reaches the building, is also located in the south of the building (Figures 2 and 3). Information on when the building was last used, construction or repair dates could not be found. The oldest images from satellite photographs were obtained in 2004, and it was determined that the building had no upper cover and remained idle at that time.

Figure 2. Minasin Değirmeni 2004 and 2023 satellite images (Source: Google Earth)
The only data we have about the architecture of the building is the body walls. Apart from the door and window openings, no structural elements such as doors, windows, floors and ceilings could be found in the body walls with rows of rubble stone. In the interior of the two-storey building, only traces of flooring between the two floors were detected, and no traces of the ceiling and other joinery could be found. Only traces of wooden beams can be seen as gaps in the walls.

The entrance to the building is from the east and north facades. The space organization cannot be read due to the absence of dividing walls in the interior of the rectangular planned building mass, which is entered through the arched door. On the east façade, which is the entrance façade, there is an arch window space surrounded by smooth cut stone jambs, 5 at the top and 5 at the bottom, and 1 arch door space surrounded by a smooth cut stone jamb. On the south façade, there is an arch window space surrounded by two smooth cut stone jambs at the top and three at the bottom. On the north façade, there is an arch door space surrounded by a smooth cut stone jamb, and an arch window space surrounded by two smooth cut stone jambs at the bottom and three at the top. The façade organization of the western façade cannot be clearly understood due to the ivy. Only the lower two window spaces were identified. It will be revealed after the removal of the plant (Figures 4, 5, 6).
The absence of a top cover caused adverse weather conditions to be let in and, accordingly, grass to grow on the ground floor. The building has been exposed to a lot of vegetation on both the main walls and the floor (Figure 7).

4. Contemporary Annex as Conservation Proposal
For the conservation recommendations regarding the use of the building, it is primarily aimed to provide a new function. This function was determined in line with the needs of the neighborhood and city in which it is located. It was decided to use it as a multi-purpose hall where both stage performances and exhibitions can be held. For this reason, after the heavily damaged body walls of the building are strengthened by injection method, they should be exhibited as an open-air museum and serve with a new contemporary addition. The best example of this is Esma Sultan Mansion (Figure 8). In the mansion, which was preserved and opened for use with a similar method, the new structure does not put any load on the body walls.
While designing the contemporary addition, in line with the criteria mentioned by Mine Tanaç Zeren, a mass that was transparent, had a new material and structure that would contrast with the main mass, and was high enough not to crush the building was designed. The mass designed in the context of these criteria was also considered to apply insulated surfaces, taking into account the climatic conditions. The climate conditions of Isparta have characteristics of a transition zone between the Mediterranean and Continental climate. Considering both the snow load due to snowfall, the number of sunny days, and the direction and degree of sunlight, a steel structure with insulation and a top cover to carry the snow load was designed.

The use of existing doors has become mandatory in space organization. The east facade is considered as the main entrance and the north facade entrance is considered as the service entrance. Since there would be a need for backstage preparation in the interior, the north entrance was moved to the backstage. A section elevated with a mezzanine floor was created on the inside of the south wall. This is where a projection device that will provide digital images can be placed on the stage, or exhibitions etc. will allow it to be used for functions. Toilet etc. The need for wet areas and a place to store items in the living room arose. However, it has been realized that the clean area inside the building should not be used for these functions. Because the area is only large enough to function as a living room. For this reason, a separate toilet and storage area was determined in the layout plan (Figure 9, 10, 11).

Figure 8. Esma Sultan Mansion (URL 4, 5)

Figure 9. Contemporary annex with Minas Mill Refunctional 3D Model (Prepared by the authors).
Figure 10. Interior image of the Contemporary annex with Minas’s Mill Re-functional 3D Model (Prepared by the authors).

Figure 11. Minasin Mill Refunctional Plan Proposal (Prepared by the authors).
5. Conclusion and Evaluation
In different academic studies and practices, re-functional suggestions have been developed for many historical buildings, especially industrial heritage or industrial archaeology, and contemporary annexes and masses have been designed in some of them. As mentioned before, while re-functioning industrial archeology and heritage, different contemporary addition typologies are used according to the comfort conditions of the day. However, there is no example of a contemporary addition to this type of industrial heritage in Isparta, located in the western Mediterranean of Turkey. There is no registered industrial heritage structure other than Güneykent Rose Oil Factory. The absence of any example of contemporary addition to industrial heritage in Isparta and its immediate surroundings increases the originality of this study. A conservation application proposal has been developed that will both make the mill, which is an industrial archaeology, noticeable and create excitement for the city about how it can be preserved.

In Isparta, conservation strategies have been developed and a contemporary annex mass has been designed in order to increase the awareness of the Minasın Mill, which is not under protection because it is not registered, is not included in the literature, and is on the verge of being forgotten by the public. It is planned to share the data resulting from the study with the local people. With the encouragement of the public, the necessary work can be initiated to bring this industrial archeology, which has not been used for years, to the region. In addition, this article, which is a very original study specifically about Minasın Mill, which has not been the subject of any study before, will also contribute to the literature on the cultural heritage of Isparta.

Acknowledgements
This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interests
The Author(s) declare(s) that there is no conflict of interest.

References


URL 1: https://ecarch.com/works/beyoglu-belediyesi/ (13.03.2024)
URL 2: https://ozhanozturk.com/2019/07/07/brisith-museum-londra/#google_vignette (12.03.2024)
URL 3: https://www.archdaily.com/783283/20-creative-adaptive-reuse-projects (10.03.2024)
URL 4: https://kulturenvanteri.com/tr/yer/esma-sultan-yalisi/#17.1/41.04763/29.027435 (13.03.2024)
URL 5: https://www.archiv.com.tr/proje/esma-sultan1/12296 (12.03.2024)


