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H U R I Y E A R M A Ğ A N D O Ğ A N

ARCHITECTURAL TYPOLOGIES APPEARED BY MODERNISM: CASE STUDY OF THE EDİRNE ZEPPELIN HANGAR

Summary. When modernism started to be seen in architectural spheres, it did not emerge just with an architectural language for design but also with new architectural typologies. Due to the main discourse of the Modern Movement with the famous quote of Louis Sullivan, “Form follows function”, new building types which were explicitly designed for their functions have appeared. However, over time, while some of these functional buildings kept their functions, some of them either lost their function entirely already, or the technology which created that function is in a downward trend. Zeppelin/airship hangars are amongst those buildings constructed for a specific function in the early 20th century which have lost that function in the present. Therefore, even though they might not reflect any tangible qualities, the function can operate as an intangible cultural reference. The object of this paper is one of those zeppelin hangars, which is located in Edirne, Turkey. The research attempts to categorise the architectural typologies that appeared by modernism, and apply a case study method to the Edirne Zeppelin Hangar to gain insight towards the problem, which is related to the consequences created by the language of the Modern Movement due to the emphasis of the function, and to discuss the possible adaptive reuse strategies regarding these artefacts which totally lost their functions. It is concluded that it is not possible to transform all the building stock that emerged in the built environment into museums, including the Edirne Zeppelin Hangar; however, inconsequential to the designated purposes, it is crucial to leave intangible references to the previous function in its design process.

Keywords: adaptive reuse, modern movement, modern architecture, Turkey, zeppelin hangar.

INTRODUCTION

After the industrial revolution, the speed of technology increased immensely. Especially in the late 19th and early 20th century, with the invention of automobiles, airships, telephone and radio, human life changed irreversibly. All these new inventions required and developed new building typologies in the era of the Modern Movement. While some of these buildings are still functional, some are slowly losing their functions due to the new way of living in contemporary society. It is possible to argue that this might not be merely an issue of 20th century architecture but can also be detected in architectural objects of previous eras. However, due to the language of the Modern Movement and its discourse which emphasises that the form is required to follow the function, it can be stated that it is more commonly seen in these structures.

According to Fabio Carrera, the built environment, which is dysfunctional for its users, is often the

symptom or the result of the designers conflicting with the users.¹ However, when the architecture of the building is designed for specific users or a usage, it can create issues in the continuity of the structures. The Modern Movement in architecture led to the creation of buildings that were specifically designed to serve a particular function. The discourse of the Modern Movement focused on developing an architectural design which has its base point from the function of the building. Therefore, it established a common problem in the following decades, which eventually generated various issues.

First of all, due to the fast pace of technological developments and changes in society, some structures lost their functions. However, the form of the buildings originated from the function of the building. Therefore, these buildings either stayed without a function or required specific adaptive reuse strategies, since it was not easy to find a function which could be compatible with the original

form of the building. Furthermore, according to Ewa Węclawowicz-Gyurkovich, from time to time, new living conditions and lifestyles occur in societies, which may lead to changes in historical buildings with the intention of protecting them from demolition.² Hence, it was not that easy to change the buildings while respecting their architectural characteristics. As a consequence, a large amount of building stock accumulated, which was waiting for a new function, and that frequently resulted in them to become abandoned for some time.

Secondly, the Modern Movement structures had another issue, which was related to the experimental nature of the buildings, both in the sense of design and, at the same time, in the sense of the material. The architects of the time used materials that did not have the ability to last long; furthermore, some of them can be considered dangerous in contemporary conditions. One of those materials was asbestos. Asbestos was started to be used in the 1900s in different forms, such as millboard as a lining for fireproof cases, as a refractory for lining furnaces, and in lining cold storage buildings in construction.³ However, the hazards of its dust and its connection with lung cancer were realised in the 1930s, and it became shown as even more evident by Richard Doll in 1955.⁴ As a result, realising the negative effect of some of these experimental materials resulted in either demolishing the buildings or allowing them to stay abandoned. However, the issue of preparing a specific strategy regarding what can be done with this building stock also emerged.

Finally, the buildings from the modernist era also stirred the topic of heritage protection due to their own discourse. The modernist idea of technological progress and aiming at being the reflection of the own era in the language of architecture can be seen as a controversial idea with restoration.⁵ Furthermore, aiming at the requirements of contemporary society, future, and dynamism clashed fundamentally with the conservationist attempt to preserve the artefact.⁶ Therefore, the question regarding the strategy that should be followed about the Modern Movement objects stayed solid when they became heritage as well. In that regard, the topic

concerning modernist buildings with their specific architectural typologies converted into an ongoing problem in architecture, both in theory and practice.

To understand the architectural typologies that appeared in the Modern Movement, one of the strategies can be dividing this building stock into categories for more detailed analysis. As stated by Dirk Jacobs, categorisation has considerable importance in research since clear definitions, replicable categorisations, and selection of a case study are one of central features in various areas of social science.⁷ The architectural typologies, such as repetitive characteristics of similar structures with common morphological features which evolved over time due to the social, economic, political, and religious conditions of each region, tend to be found as a point of classification.⁸ In that regard, according to the current conditions of the built stock of the Modern Movement, it can be divided into two categories that are related to their intangible qualities, which reflect their functions as cultural references.

The first category can be *functioning buildings*, which are either still functional or rapidly losing their functions. Cinema buildings, post offices and gas/petrol/service stations can be given as examples for this category; furthermore, some factories built for a specific purpose can also be added. On the other hand, the second category can be regarded for the buildings with functions that have already *vanished* from the architectural spheres due to not being used anymore. Since the form of these modernist structures was closely related to the original functions, when the function is lost, these structures require adaptive reuse. Unfortunately, if no measures are taken for the situation, these structures encounter deterioration or abandonment. Telephone exchange buildings and zeppelin hangars can be regarded as examples of this *vanished functions* category. In this article, the main focus is on the *vanished functions* category of buildings and how these buildings can go through a compatible adaptive reuse process. Therefore, a case study from Edirne, Turkey is selected for analysis.

The paper contains two main parts. The first part gives information regarding the various building types from the first category: *functioning buildings*, and the second category: *vanished functions* and how they occurred in architecture. Furthermore, it provides brief information and analyses the current status of these building types. The second part focuses on a case study of Edirne Zeppelin Hangar, which is from the *vanished functions* category, analysing its architectural features and its current situation. Finally, the article discusses possible adaptive reuse strategies for the *vanished functions* category buildings in the example of the case study.

MODERNIST BUILDINGS WITH SPECIFIC FUNCTIONS

Modern Movement buildings were often characterised by simple, functional designs that emphasised efficiency and ease of use. However, some of the building types that emerged during this period were designed for specific functions, which are summarised in two different categories.

Category I: Functioning Buildings

a. Cinema Buildings

Cinema came into the life of the people after the first motion picture was invented in the 19th century. However, in the early 20th century, cinema became a more sophisticated art form and part of life in the urban environment. On the other hand, cinema was also used as a form of political propaganda to spread the message by the governments. Especially countries such as Italy used this new medium in their colonial lands, which they annexed after the First World War.⁹ However, cinema established a new expression of the culture and, at the same time, presented a new form of public space for entertainment. According to Menteş & Donà, the space for the cinema was first limited to itinerant marquees; however, between 1905 and 1915, in the USA, nickelodeons started to increase, which were early motion-picture theatres that were popular among the working and middle class.¹⁰ Subsequently, theatre buildings began to be converted into places for cinema screening, and eventually, in

the 1930s, special structures for cinemas started to be constructed.¹¹ While constructing the cinema buildings, due to the architectural expression at the time, most of the architects used the language of art deco and modernism in Europe and the USA.

Especially in the 1950s and 1960s, cinema was an established form of social entertainment both in Europe and the USA.¹² However, after televisions became more common in households, and with the rise of internet-based streaming platforms in the last decade, cinemagoing rates decreased. Therefore, the cinema theatres started to lose their functions, and the buildings became more and more abandoned.

b. Post Offices

The usage of the letter and posts for communication has a long history. However, the first building dedicated for arranging and controlling the arrival of the posts, called post offices, emerged centuries after the first post was sent. Prior to that, no regular system existed. According to Joyce, the origin and the progress of this institution became one of the most remarkable developments of modern civilisations.¹³ The requirement for the delivery of mail can be regarded as closely related to the level of education and the existence of literate individuals in society. The more people learnt how to read and write, the more the requirement for building facilities for sorting out the sent material appeared. With post offices, the ability to communicate with distant places became more accessible and more convenient, for both royalty and common people. According to Gallagher, post offices were the incubator of the disputatious culture of innovative ideas and uncensored opinions in the USA, since mail service and knowledge of affairs had previously been limited to the elite.¹⁴ In that regard, it might be possible to state that the post offices were also among those buildings which changed the dynamics of society. However, this was not only in the USA, but affected all over the world.

The fast pace of technological changes also affected the postal services. While it was formerly a crucial part of communication, especially starting in

the late 20th century, people stopped using mail, and the usage of the internet for communication became more common.

c. Gas/Petrol/Service Stations

When the usage of the automobile became more common and cheaper cars started to be produced, the need for providing gas to the users occurred, especially nearby long routes. It was a gradual process which led to the design of these specific structures. According to Witzel, to begin with, the fuel was not provided from specific places assigned to its sale, but by hand pumping from petrol cans.¹⁵ However, due to the increasing number of cars, new places started to be designed for selling fuel, which included service stations, canopies, and small kiosks. Therefore, the roadside landscape started to change with the construction of gas/petrol/service stations. One of the architectural characteristics of these stations concerning their design can be regarded as their easily recognisable nature. As stated by Bagnolo and Rosas, the architectural design of these facilities aimed at identifying the brand and the services associated with it, which would provide visibility for the business and emphasise its distinctive features.¹⁶ However, these kinds of design characteristics occurred after the stations became chains, and large oil companies started to own a more considerable portion of the structures in the market. To begin with, petrol stations were owned by individuals, which gave them more of a character.

Even though petrol stations have not yet lost their functions, developments in the car industry, now mainly focusing on hybrid or electric cars, mean it is possible that they are going to lose their functions soon.

Category II: Vanished Functions

a. Telephone Exchange Buildings

The telephone is one of the most important inventions of modern society. While communication before the telephone was provided by mail and telegrams, which did not allow a simultaneous connection, telephones filled the gap and improved communication. The first patent for the telephone

was taken in the USA by Alexander Graham Bell in 1876.¹⁷ However, the telephone he invented did not allow communication with other phones without any physical connection with a cable. Therefore, it was limited to connecting only two users with direct contact. In that regard, the telephone exchange buildings were a milestone in telecommunication, since they allowed more than two users to be able to reach each other. First, telephones were only used between companies, but subsequently, after the invention of the commercial telephone switchboard, the first telephone exchange building was constructed in 1877–1878. Within three years, approximately 49,000 people were using phones.¹⁸ At the time, the cables were required to be changed by operators manually, which created the need for a specific building related to this function.

Telephone exchange buildings were used for a long time to provide communication between users around the world. However, the need for connecting the cables manually vanished after digitalisation started. Therefore, the buildings essential for establishing direct contact and supporting the globalisation of the world started to lose their function, which resulted in either demolishing these structures or refunctioning them.

b. Zeppelin Hangars

Hot air balloons have existed since the late 17th century.¹⁹ However, the commercial use of hot air balloons started only early 19th century, since these vehicles were not able to move horizontally unless pushed by air conditions or the wind – before the invention of the zeppelin. According to Camilleri, a zeppelin or blimp is a buoyant aircraft which can be steered and propelled through the air, depending on the decision of its pilot.²⁰ The first experimental flight of the zeppelin was in 1900, which lasted only 18 minutes, and the first commercial flight happened in 1910.²¹ However, zeppelins were used not only for transporting passengers but also for postal services between the continents, and by the military for bombardment during the First World War. In the interwar period, the commercial travels of the zeppelin continued. However, the start of the Second World War, and the impact of the 1937



Fig. 1: The general view of the hangar from the highway. Photo by Huriye Armağan Doğan, 2021

Hindenburg disaster, affected the usage of these airships for commercial purposes.²² Although, it can also be stated that the increasing pace of technology, with aeroplanes becoming a faster and more reliable means of transportation, might have also ended the heyday of the zeppelins.

When they were not used, zeppelins were housed in special hangars which were designed for these vehicles. Zeppelin hangars are large architectural objects used both to house and, at the same time, to maintain these giant airships. However, since these airships are no longer used, most of the hangars either underwent adaptive reuse or were left abandoned. Today, only a few zeppelin hangars remain operational.

CASE STUDY: EDİRNE ZEPPELIN HANGAR

Even though the Zeppelin Hangar still exists, unfortunately, there is not much information about the building. It is located on the European Motorway in Edirne, around the village of Avarız. The building is surrounded by fields and structures used for military purposes in the Ottoman period (Fig. 1). In the immediate vicinity of the hangar, there are defence facilities, military bastions, military hospitals, baths and barracks. Therefore, it can be stated that it might be part of the military complex for the defence of the Edirne district as well.

The importance of this structure was first mentioned in a significant discussion at the DOCOMOMO Turkey meeting (International Committee for Documentation and Conservation of Buildings, Sites and Neighbourhoods of the Modern Movement) in 2014.²³ Later, it was registered to the inventory of cultural heritage in Edirne region in 2017. The building was initially built for the repair, maintenance and, at the same time, for the storage of zeppelins. Unfortunately, the architect of the building and the construction date is not known; however, it is believed that it was before 1913.²⁴

When the planning scheme and the design of the structure are analysed, it can be stated that it is similar to the zeppelin hangars which were built in France in the late 19th century. It has a central axis which is a two-story high volume, and two symmetrical side sections, which are only one floor high. The height of the outer wall at the side sections is 2.40 metres, and the height of the central axis is about 12 metres. While one of these sections has two big rooms and a small room, the other section is not divided and is used as one capacious space (Fig. 2).

All of the rooms have direct access from the façade of the building with a door, and they have windows which allow sunlight to reach each of the rooms. However, some of the windows were blocked with bricks in later periods, especially the ones on the

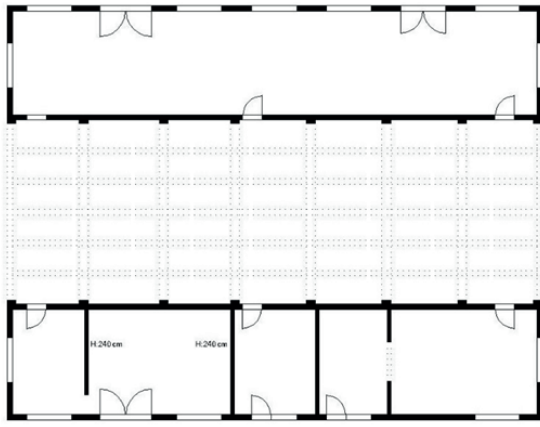


Fig. 2. The planning scheme (Source: H. Burcu Özgüven, Aslı Meral and Saygın Alkan, 2014)

upper floor. The central axis, which only has windows on the upper floor, is covered with a reinforced concrete vault. On the other hand, the side sections are covered with a pent roof. The building is an early example of reinforced concrete. The main body is covered by a reinforced concrete vault, with reinforced concrete beams every 4–4.5 metres between the walls, and the vault is supported by horizontal beams parallel to the long side. The reinforcement coming out of the walls and beams resembles the cast iron material used in early reinforced concrete examples. The brick used in the building is close to the non-standard local brick material used in early twentieth-century apartment buildings. However, modern brick infill interventions are also seen on the walls of the building. Falling plaster and cracks both on the façade and other walls indicate the destruction of the building. All the windows on the façade and the section where the vault connects with the main outer walls contain moulding, which emphasises the edges. The moulding around the windows creates the impression that it was influenced by Art Nouveau and early Art Deco expressions. Therefore, it solidifies the argument that the building was built around the 1910s (Fig. 3).

According to the inventory of the building, the skeleton of the building is relatively deteriorated (Fig. 4). However, it is structurally in good condition.²⁵ When the various historic photographs of the structure and the building are analysed at the site, it can be noted that the entrance of the central axis was only from the front. Therefore, the rear



Fig. 3. Details created by the moulding around the windows of the hangar (Source: H. Burcu Özgüven, Aslı Meral and Saygın Alkan, 2014)

wall had either collapsed or been destroyed over the years. Unfortunately, no trace of the original door or any similar element was detected. On both sides of the entrance, there is a relief resembling a capital of columns, which creates the impression that there was an aesthetic concern in the design of the building, rather than the expression of just functionalism.

Furthermore, on the curvilinear pediment above the entrance, between the vault and the upper level of the entrance opening, there is a vague trace of an inscription or a square-shaped plate; however, there is not enough evidence about it, and it cannot be discerned on the historical photographs (Fig. 5). Therefore, it might have been added to the façade in a later period.

Due to the reinforced concrete structural system of the building, the missing wall at the rear façade does not affect the stability of the building. However, some structural cracks were noticed on the columns, and some incompatible repairs were identified.²⁶ The building was used as a salt depot for the General Directory of Highways for a while; however, it is currently abandoned. As stated in the DOCOMOMO presentation, the balloon hangar is a rare type of building in Turkey in several respects: in terms of the place of the military balloon in its aviation history; in terms of the modern construction history as an early example of reinforced concrete with large openings; and, furthermore, in terms of the architectural typological characteristics of



Fig. 4. Front façade of the hangar. Photo by Huriye Armağan Doğan, 2021

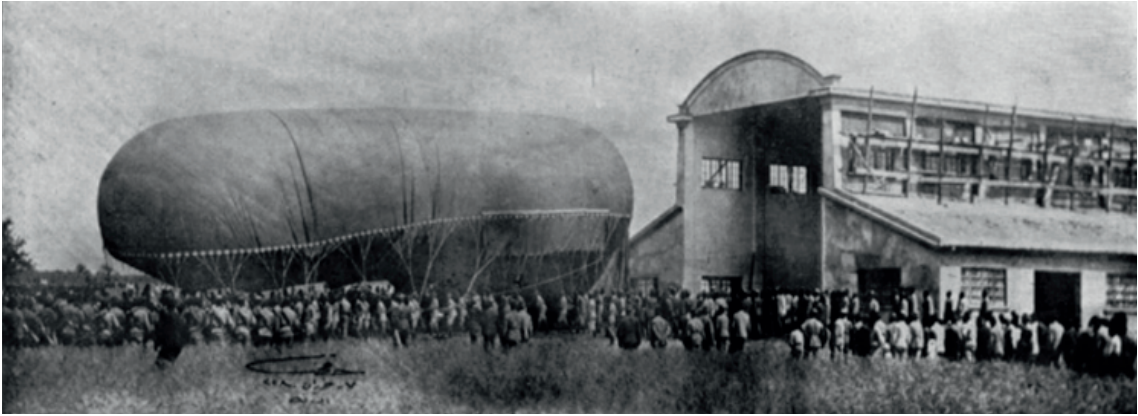


Fig. 5. Historic photograph of the hangar from the Imperial Ottoman Archives, BOA, HH:Ş10/199

Y-shaped hangar buildings all over the world.²⁷ Therefore, an extensive restoration and, if needed, preparation of an adaptive reuse strategy with a relevant function is necessary.

DISCUSSION

In the case of the Zeppelin Hangar in Edirne, keeping the original function is impossible. Therefore, finding a relevant function is one of the priorities. However, while assigning the new function, it is essential not to move the focus from the original function of the building for the continuity of its intangible cultural reference feature. One of the adaptive reuse examples of zeppelin hangars can be found in Riga, Latvia. In the case of these buildings,

a new function was provided by the Riga City Council by converting them into the Riga Central Market, with the intention of fostering Latvian civic identity within a new public space.²⁸ However, even though the new function of the building provided a fresh start for the structure, increasing numbers of large supermarkets and economic crises are known to be affected the structure and its relevance to staying as a locally meaningful space.²⁹ Therefore, merely using these massive structures as an elastic envelope of a place can still be problematic, and keeping the emphasis on the original function might be a better solution for the hangars. Therefore, a museum which would focus on the history of these specific airships could be a good option for the Zeppelin Hangar in Edirne.

Since these airships are not used anymore, explaining these vehicles to new generations can be a good starting point for the usage of the building and solidifying it as a cultural reference. In adaptive reuse, one of the most important criteria is, if possible, to facilitate the continuity of the structure, not only in the physical sense but also in the sense of the place. However, the structures sometimes need to react and adapt to the changing context of the environment and society in a coherent manner.³⁰ Especially the buildings which were designed with the language of the Modern Movement tend to face these challenges the most, since the design of the building follows its function. In some cases, the changes made by the adaptive reuse projects can require compromise, and can be a trade-off between adding an attractive function to a building and causing damage to the *genius loci*.³¹ Hence, it might not only be related to the attractiveness of the new function, which can be adapted, but the features of the building can also be one of the crucial criteria in the decision-making process.

However, the particular location of the Edirne Zeppelin Hangar could have a tendency to affect the identification of the relevant function of the building. The structure's location, next to a highway, can be one of the parameters for the decision. The building does not have any road, other than the highway which directly reaches it, and that could create transportation issues for the visitors if it were converted into a museum. Furthermore, there are many abandoned military buildings nearby the structure, which could also create safety issues. Therefore, while offering a new function for the building, it should not only be evaluated in the scale of the structure but also in the scale of the complex, which would make it more beneficial for society. In that regard, the process needs to be conducted very carefully.

CONCLUSION

The Modern Movement era in architecture arrived in the life of modern society with various innovations. These innovations were not only limited to

the materials which were used during the construction, but they were also the architectural building typologies that were the outcome of the technological developments. However, in some cases, the new technology of the modernist era either has expired in the present society (Category II) or is about to expire (Category I). In that regard, it is important to construct relevant strategies for these categories of buildings to manage the issue.

Currently, the issue regarding the structures built based on Modern Movement principles is becoming increasingly problematic, since it creates a considerable building stock that is no longer used. This relates to both the usage of the experimental materials and the original function. Therefore, adaptive reuse can be one of the strategies to follow for the usage of these buildings in a productive manner. However, finding the relevant function can be problematic as well. If the emphasis is desired to be kept on the original function of the building, converting the building to a museum can be an option. However, it is not always possible to convert each building into a museum, since it might then create another issue regarding unused buildings. Therefore, while making any decision, it is crucial to focus on the interests of the members of the present generation of society.

In the case of the Edirne Zeppelin Hangar, it is concluded that it might not be easy to adapt the structure into a museum due to both the accessibility of the location and, at the same time, the fact that it is not possible to consider it as an individual building, but as a part of a military complex. However, inconsequential to the designated purpose, it is crucial to leave intangible references to the previous function in its design process.

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ARCHITEKTŪRINĖS TIPOLOGIJOS, ATsirADUSIOS IŠ MODERNIZMO: EDIRNE ZEPPELIN ANGARO ATVEJO TYRIMAS

Santrauka

Kai modernizmas pasimatė architektūroje, jis reiškėsi ne tik architektūrinio dizaino kalba, bet ir naujomis architektūrinėmis tipologijomis. Dėl *Modernaus judėjimo* diskurse garsios Louiso Sullivano citatos „Forma seka funkciją“ pastebime naujus pastatų tipus, kurie suprojektuoti aiškiai pagal pastato funkcijas. Visgi bėgant laikui, tik dalis šių pastatų išlaikė savo funkcijas, o kai kurie iš jų arba visiškai prarado savo funkciją, arba ji ženkliai sumažėjo. Cepelinų-dirizablių angaras yra vienas iš tokių pastatų, kurie atsirado dėl specifinės XX a. pradžioje atsiradusios funkcijos, kurią pastatas šiuo metu jau praradęs. Net ir neatspindėdama jokių apčiuopiamų vertės savybių, funkcija gali pradėti veikti kaip nemateriali kultūros nuoroda. Šio darbo objektas yra vienas iš cepelinų angarų, kuris yra Edirne, Turkijoje. Tyrime bandoma apžvelgti dėl modernizmo atsiradusias architektūrines tipologijas ir atvejo analizės metodą pritaikyti Edirne Zeppelin angarui. Straipsnyje siekiama išvelgti problemą, susijusią su *Modernaus judėjimo* kalbos pasekmėmis, būtent dėl pastato funkcijos akcentavimo. Siekiama aptarti galimas adaptyvaus pakartotinio naudojimo strategijas, susijusias su artefaktais, kurie visiškai praradę savo funkcijas. Daroma išvada, kad neįmanoma visų šių pastatų paversti muziejais, įskaitant Edirne Zeppelin angarą, tačiau, nepaisant pastato naujosios paskirties, labai svarbu išsaugoti nematerialias nuorodas į pastato pradinę funkciją.

Reikšminiai žodžiai: adaptyvus pakartotinis naudojimas, modernus judėjimas, moderni architektūra, Turkija, cepelinų angaras.

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