



Haliç Metro Crossing Bridge. A Bridge in the Historical Heart of Istanbul

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73.1 Introduction

The Haliç Metro Crossing Bridge in Istanbul is a bridge whose design and implementation was influenced by the complex and articulated framework that concerns the preservation and enhancement of cities included on the UNESCO World Heritage List (Fig. 73.1).

Planned as a necessary infrastructure for the development of the city by the Istanbul Metropolitan Municipality, the UNESCO Committee considered the realization of this bridge in contrast to the Outstanding Universal Values for which the four historic areas of Istanbul were registered on the World Heritage List in 1985 (Fig. 73.2).

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For this reason, in 2010, a group of experts was appointed to evaluate the insertion of this new bridge in the Golden Horn (Haliç), with particular reference to the contrast that the bridge pylons would cause in relation to the historical skyline of the city (silhouette) (Fig. 73.3).

The careful work of assessment has been made together with the designer and the construction company of the bridge. This cooperation has made possible to define a solution that is able to consider the needs of development and the extraordinary significance of the city, this last especially considering the delicate historical context in which this bridge is inserted (Fig. 73.4).

The cultural occasion offered by the implementation path of this bridge, in the historical heart of Istanbul, was to recognize infrastructure as the part of the urban landscape. The inclusion of new architecture in historic cities is not to be excluded a priori; on the contrary, it is desirable considering the dynamic perspective of Istanbul provided that the new work is able to assimilate in its design and features a deep understanding of the context and the “stratification of meaning” of the place. This understanding and knowledge should be based on a multidisciplinary approach in the design process, and the design should be capable of defining and evaluating resources and qualities that characterize the territory and its potential and need for change.



Fig. 73.1 The Halic Metro Crossing Bridge and the Süleymaniye Mosque in the background

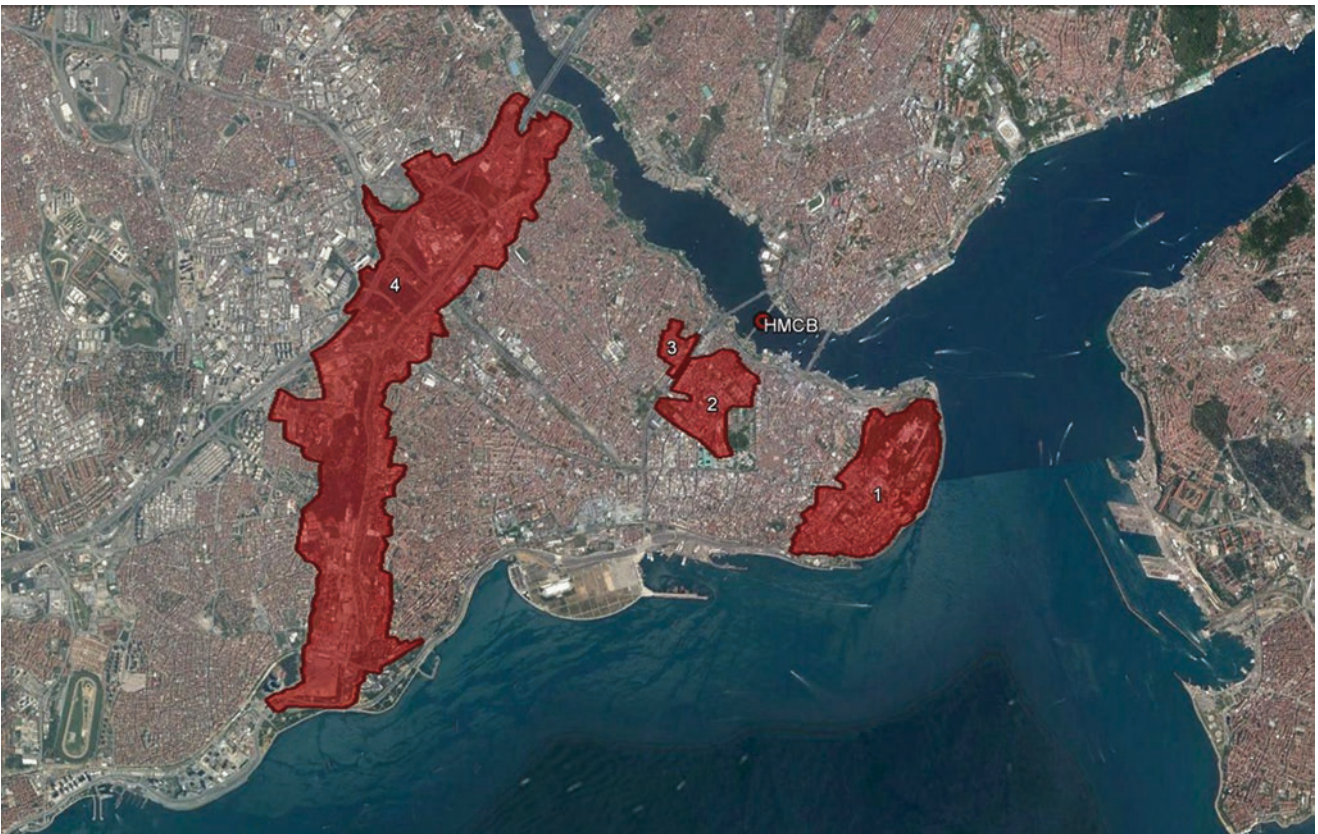


Fig. 73.2 The red point shows the position of the Halic Metro Crossing Bridge; 1, the Archaeological Park; 2, Süleymaniye Mosque and its associated Conservation Area; 3, Zeyrek Mosque (Pantocrator Church) and its associated Conservation Area; 4, Land Walls of Istanbul



Fig. 73.3 The Haliç Metro Crossing Bridge against the Süleymaniye Mosque approaching from Beyoglu to the Ataturk-Unkapani Bridge

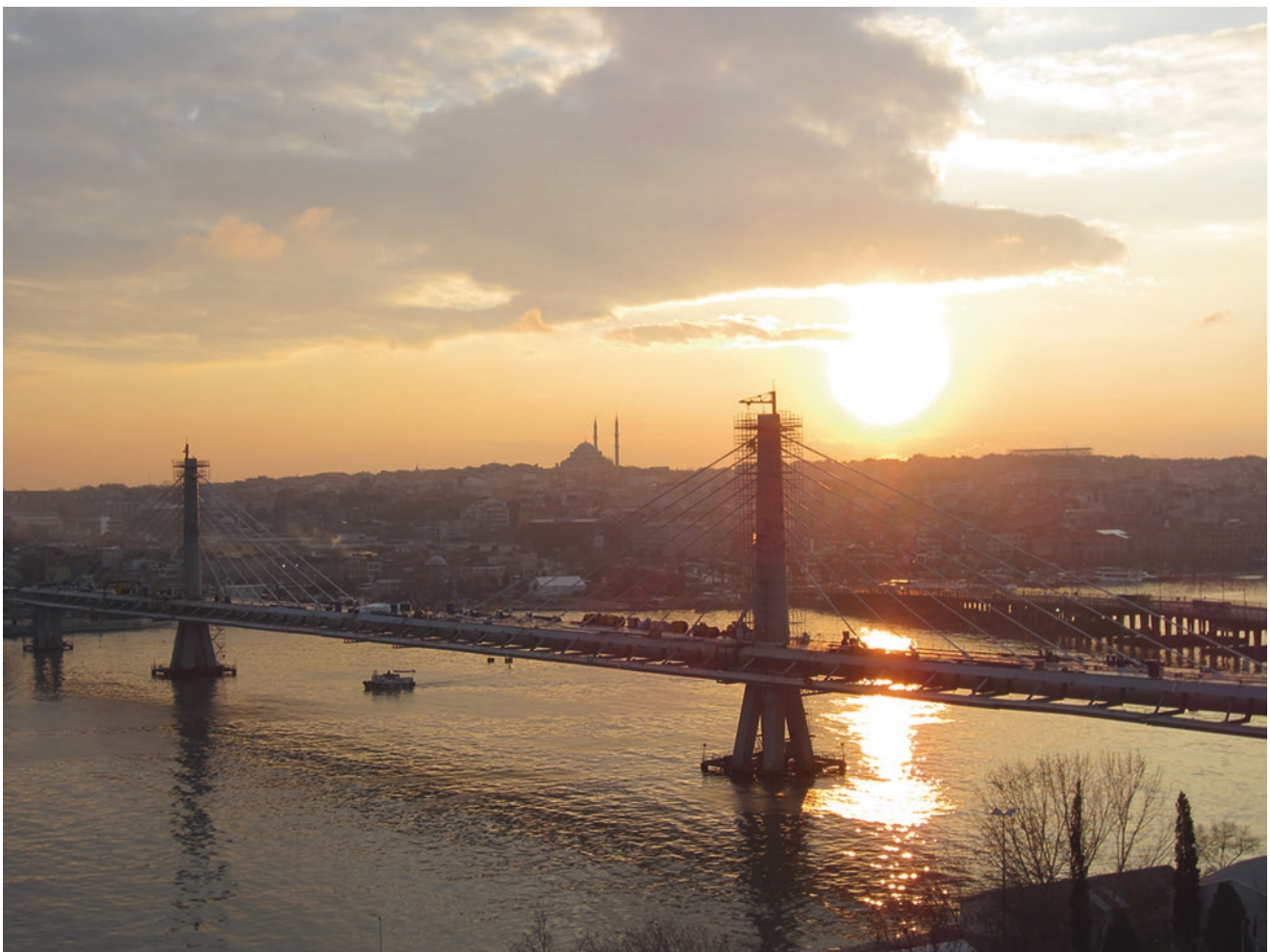


Fig. 73.4 The Haliç Metro Crossing Bridge against the Fatih Camii Mosque (not included in the World Heritage areas)

73.2 The Design of the Metro Bridge

The Golden Horn, a place of historical and perceptible stratifications, is an inlet that divides the heart of Istanbul by forming a natural harbour that was a nodal point in the history of the city's development. Considering the city as a place for exchanges and relationships, this place is a paradigm, both in its physical configuration, with the skyline resulting from changes over time as well as geopolitical.

In this context, there are many important works that are rapidly changing the face of the city. The Golden Horn Metro Crossing Bridge is one of them, a bridge that belongs to the metro line that moves on an east-west route connecting the heart of the city with the Ataturk International Airport.

The bridge, designed as a cable-stayed type in 2004 by the Turkish architect Hakan Kiran and by Prof. Michel Virlogeux, has a central span of 180 m and two sides of 90 m. To this 360 m cable-stayed system is attached a swing bridge with a main span of 70 m and a secondary of 50 m. To complete the system, there are two approaching viaducts forming a total length of about 1 km (Fig. 73.5).

The choice of this type is the result of a series of in-depth assessments of technical and environmental aspects of the area. Due to the great historical value of the area, the bridge has undergone numerous design changes over time in order to define the minor impact on the city's values and on the urban landscape. The changes were defined by a continuous design research in the modulation of the height and the shape of the pylons, the shape of the pedestrian ground connections and the colour and lighting of the whole structure.

The two pylons support the structure rise 65 m over the water; the original design was expected to be 88 m; the section of the pylons where the cable start stands 47 m over the water while the original design was 80 m (Fig. 73.6).

The structure is composed by an orthotropic slab system made up of three main cells, which supports a double rail-road line. To this system two lateral pedestrian ways are attached (Fig. 73.7a, b).

The most interesting feature of this metro bridge is that it hosts, in the middle of the crossing, the metro station. The position has been chosen in order to avoid direct impacts on the fabric of the historic buildings, which are present in both banks of the Haliç but especially in the historic peninsula where the old peculiar residential wooden houses are still present (Fig. 73.8a, b).

Other interesting feature is the swimming bridge. The swing bridge is located between the cable-stayed bridge and the ground connection in the Historic Peninsula (Unkapani side). It has a total length of 120 m and is divided into two segments of 50 and 70 m each by a central pier containing the rotation mechanisms. The maximum opening angle is 90° and allows ships and ferries to cross the bridge (Fig. 73.9).

This metropolitan bridge, even though posing as a valid solution to the development problems of the city, has been subjected to strong criticism for the possible impacts on the silhouette of the Historic Peninsula, which with its Outstanding Universal Values are registered in the World Heritage List and as a cultural property of universal value should be protected.

For this reason, careful assessment work was undertaken during the construction of the bridge.

73.3 The Assessment Work

The undisputed universal value of Istanbul, clearly defined by the criteria expressing the OUV's as well as the strategic and geographical importance of the area as the centre of the "natural" economic and social development system of the country, required an interdisciplinary approach to build the Historical and Visual Impact Assessment method; this allowed to control the level of interference between the new infrastructure and the context, especially considering the respect for universal values that allowed the city to be included on the World Heritage List [1].

The methodological approach was built using some parameters coded in Italy, from "DPCM 12/12/2005", for the analysis of the impacts due to the realisation of new infrastructures in the landscape, integrated with the "ICOMOS Guidance on Heritage Impact Assessment for Cultural World Heritage Properties", which defines a system that can simultaneously assess aspects related to the integrity of OUVs, changes and their effects, possible benefits deriving from negative impacts as well as a possible mitigation (Fig. 73.10).

The assessment findings have led to an architectural revision of the bridge, aimed at paying greater attention to the pedestrian as an observer, as a user of a space that has to be a place, thought and equipped for that purpose, and not just tied to the presence of the metro line.

The recommendations and suggestions for modification resulting from the assessment works developed in 2010 have been implemented during the work on site.

In this sense, all the elements able to create negative impacts on the exceptional universal values of the areas registered in the World Heritage List have been revised.

The "legs" of the piers have been modified in order to achieve greater visual permeability. The diameters of the cables hanging the deck have been reduced, and the length of the roof covering the platform station has been shortened.

An important revision design is focused on the pylons whose height has been appropriately reduced and whose shape and colour have been carefully studied in order to minimize possible interferences with the historic silhouette and the minarets of the Süleymaniye Mosque in particular.

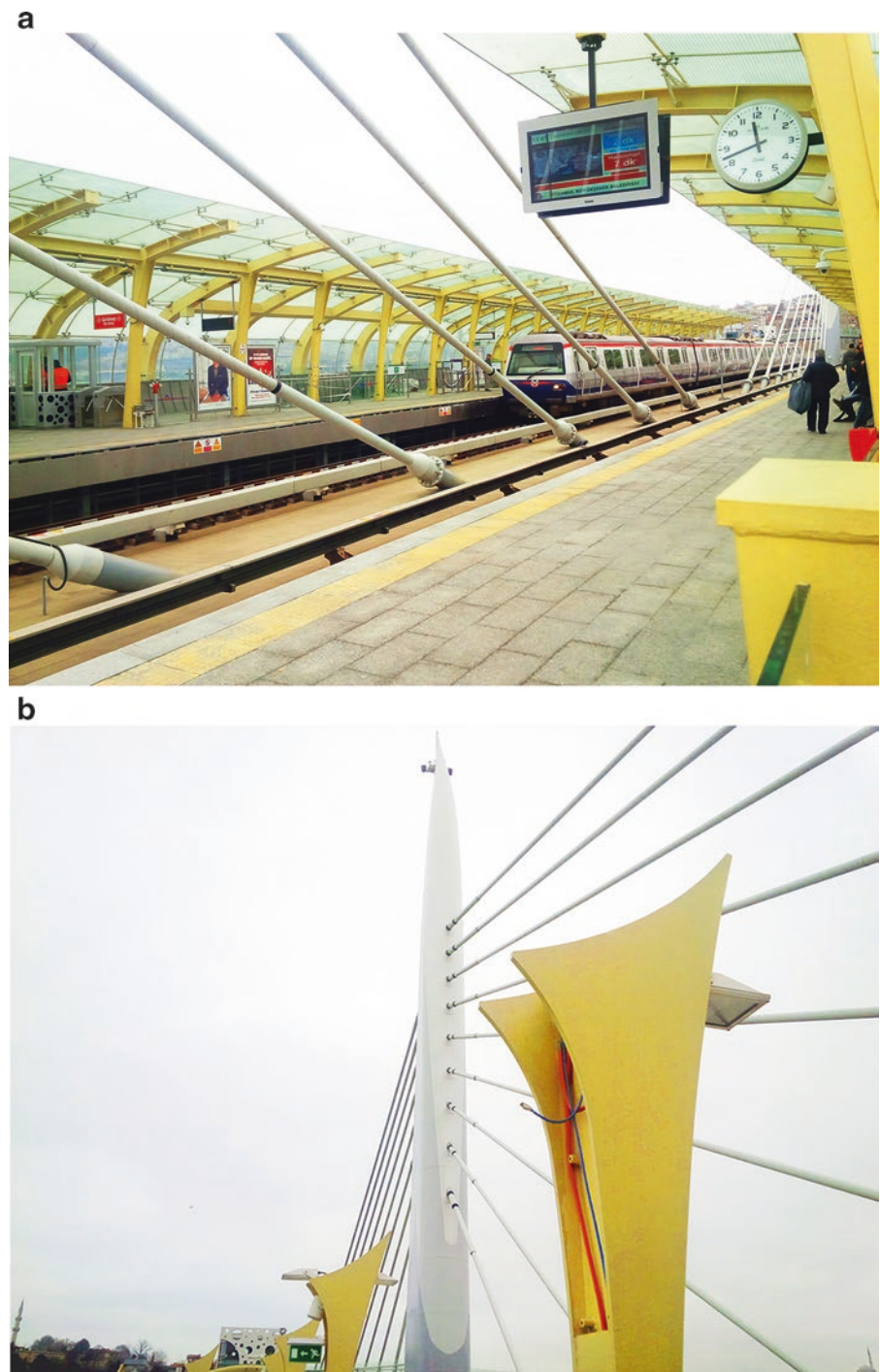


Fig. 73.5 Original design of the Haliç Metro Crossing Bridge



Fig. 73.6 Result of the final design of the Haliç Metro Crossing Bridge

Fig. 73.7 (a) The platform station in the middle of the bridge; (b) details of the poles and the pylon



Particular attention was paid to the shape of the tip of the pylons. Their height and shape have been studied in such a way as to be coherent with the general rhythm of the historical silhouette, and above all they have been shaped so as not to be confused with the minaret geometries so as not to deceive the observer (Fig. 73.11a, b).

73.4 The Chromatic Study

The colour study of the bridge concerned with the construction of scenarios is able to show the different possibilities of inserting the work into the landscape, from mitigation to the emphasis, considering several levels of coherence [2].

Fig. 73.8 (a, b) The walkways on the sides of the metro bridge



In order to construct the best scenario of effects, able to minimize the negative effects in the nightlight perception of the historical silhouette, the report of the Haliç Bridge Colours has been structured as an evaluation document with the purpose of detecting the chromatic dominance present in the landscape context affected by the bridge design and, then, defining the possible chromatic variations of the bridge colours.

Six viewpoints were chosen from which the bridge was clearly visible on a landscape scale, according to the crite-

riion of greater aggregation of people. From these six viewpoints, panoramic images were made in three different moment of the day – morning, afternoon and evening – for a total of 18 panoramic pictures (Fig. 73.12).

These panoramic pictures were analysed by detecting chromatic dominants and referring them to the elements present in the context according to the following categories: sky, sea, buildings, vegetation, infrastructures, historical buildings and backgrounds (Figs. 73.13 and 73.14).



Fig. 73.9 The swimming bridge during the test opening operations

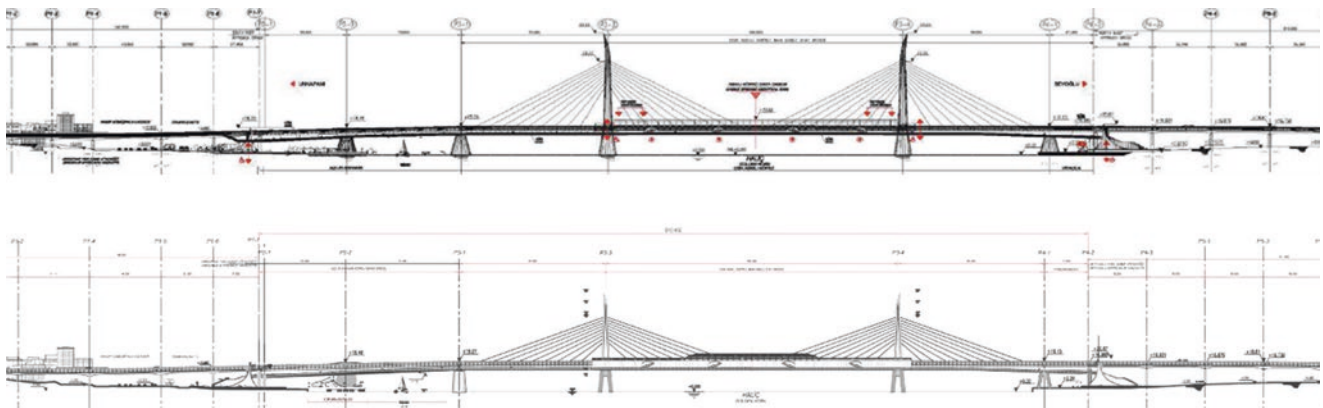


Fig. 73.10 The project of the bridge in 2012 and after the revisions defined by the assessments findings

Then, to each category was assigned a value related to its visibility, quality, cultural meaning and level of invariability.

This procedure, organized in a valuation matrix, allowed defining the hierarchy of the chromatic tables resulting from the quantitative analysis by extrapolating a set of colours that most represent the historical and cultural context of the bridge. In total, six colour palettes to paint the bridge ele-

ment were defined using the colour theory and proceeding with similar and complementary colour combinations (Fig. 73.15).

These six palettes were evaluated considering three different scenario effects:

- Towards the disappearance, that minimizes the presence of the bridge

Fig. 73.11 (a) The pylon and (b) detail of the tip. The two pylons that hang the deck are 65 m above the sea level, and the connection with the cables reaches 47 m above the sea level





Fig. 73.12 Rendering of the chromatic solution adopted for the bridge. This solution privileges the coherence of the work with the surroundings by choosing a chromatic treatment related to the elements present in the context and weighted according to their meaning



Fig. 73.13 The position of the viewpoints before the implementation of the deck and the pylons

- Towards monumentality, creating a chromatic landmark
- Towards coherence with the context, that allows the bridge to be a part of the landscape

In line with the UNESCO guidelines, aimed at maintaining the visual integrity of the historical assets, the coherence option was chosen.

73.5 Architectural Night Lighting

Another aspect aimed at reducing the impact of the bridge on the historical assets, and consequently maintaining the integrity of the OUV, was to study the night lighting of the metro bridge. Light and colour are in fact elements capable



From 9 AM to 11 AM



From 11 AM to 13 PM



From 3 PM to 4.30 PM

Fig. 73.14 Panoramic pictures taken from Galata tower during different times of the day

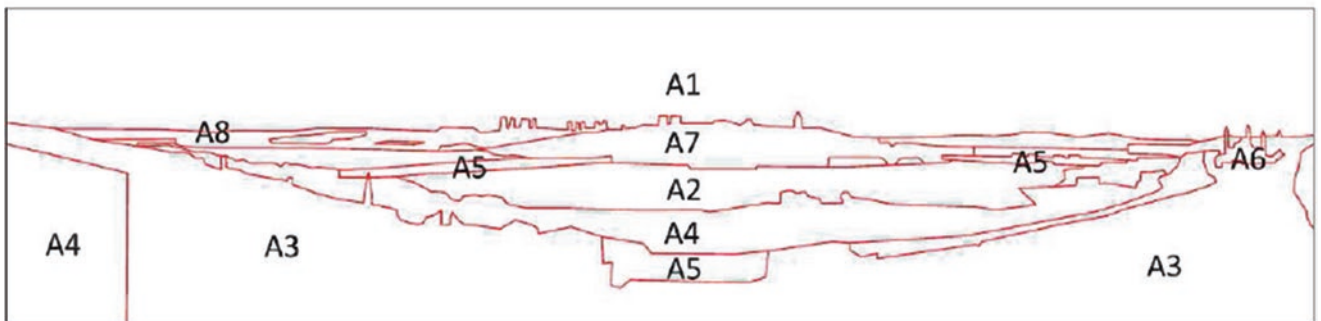


Fig. 73.15 Sample of the panoramic pictures analysis

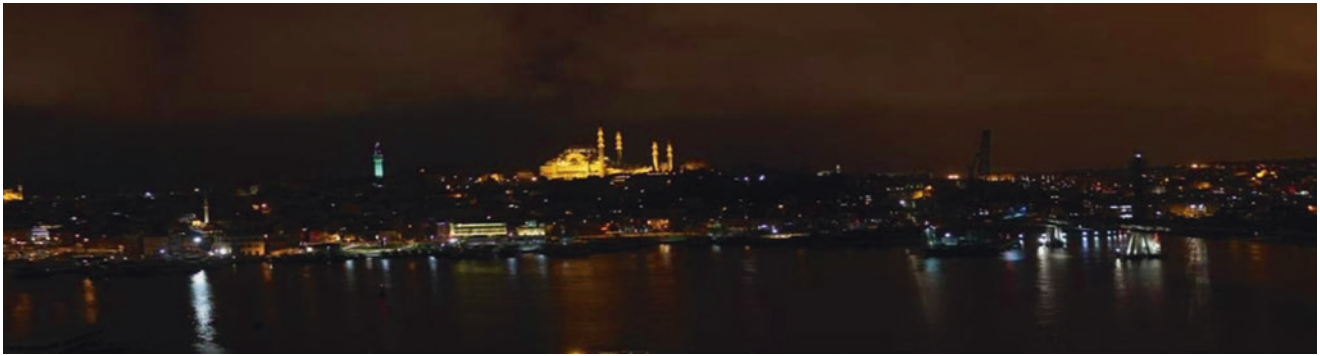


Fig. 73.16 Nocturnal context and historical assets of the Haliç Metro Crossing Bridge before construction

of influencing decisively on the perception that man has of the landscape both day and night [3].

Although these two components are closely related to each other, the complexity of the Haliç Metro Crossing Bridge issue and the undisputed importance of the world heritage context in which this work lies led to the decision to deal with the two themes separately. In relation to the study of the night lighting of the bridge, we started from the analysis of the nocturnal context related to the most common historical assets and the common urban scenery (Fig. 73.16).

From the considerations made on the basis of the analysis, three possible scenarios were developed:

- **Silent presence:** The bridge is illuminated by a thin light line that accompanies the pedestrian path and connects the two banks of the Golden Horn.
- **Cultural lighting:** The light illuminates the pedestrian path as in solution 1 with a thin wire. Also the batteries are lit.
- **Architectural lighting:** Bridge lighting becomes a beam of light that illuminates the batteries during special events throughout the year.

As of today, this proposal of night lighting, which takes into account the integrity of historical silhouette, has been implemented just partially, keeping only cultural lighting mode active at night (Fig. 73.17).

73.6 Some Considerations

Now, the bridge is built, and functioning for some years now (opening ceremony on fifteenth of February 2014), and offers a unique vantage point that allows to look at the Pera areas, with the Galata tower, Üsküdar and Kadıköy so far on the Asian side

and the entire historic peninsula. All gathered in a single magnificent silhouette. To which, somehow, the bridge also belongs.

Indeed, the construction of the bridge has led minor modifications to the skyline, but thanks to a long and meticulous work, these minor modifications have been limited at minimum level, and the general remodulation we suggested aimed to modify the project so that it could be part of the landscape in which it was inserted.

On the other hand, the bridge has proven to be a flywheel that has triggered a new consciousness and awareness to the people who daily cross the bridge and take a look at their cultural heritage, but it was also the first step towards the renewal of the degraded areas on the surroundings.

One of the most important recommendations made during the assessment work concerned the management of areas closest to the two ground connections: the landscape design that focuses on the neighbouring area of the bridge; this should be seen as the opportunity to requalify the entire area around the bridge creating a walking path involving the bridge together with all the historical texture formed by the small shops of handicrafts, catering and trade [4].

Today landscape design works around the bridge are underway and aim at the overall renovation of the entire space between the metro bridge and the Galata Bridge.

The objectives of this new renovation are the beautification of Istanbul and to support the sense of community pride together with restoration of historic sites.

The example of the Golden Horn Metro Crossing Bridge is emblematic. Through the study of the bridge and relationships that it has created in the place where it is located, the bridge has become part of the precious landscape of the city, creating new space relations and new functional and symbolic meanings to re-emphasize the stratification of the place and the change of its meaning over time [5].



Fig. 73.17 The three possible solutions for the architectural lighting during the night: 1, silent presence (the bridge is illuminated by a thin light line that accompanies the pedestrian path and connects the two banks of the Golden Horn); 2, cultural lighting (the light illuminates the

pedestrian path as in solution 1 with a thin wire; also the batteries are lit); 3, architectural lighting (bridge lighting becomes a beam of light that illuminates the batteries during special events throughout the year) (Fig. 73.18)



Fig. 73.18 The Haliç Metro Crossing Bridge just after sunset

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