Lighting Scheme as a Design Tool in Urban Identity: A Case Study at Bosphorus Region in Istanbul

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Abstract: City lighting influence people’s aesthetic perception, enhance the quality of people’s lives. At the same time, it can promote development of the city, enhance the reputation of the city, has the profound significance to politics, the economy and the culture. Good lighting design can display the culture and the characteristic of the city and build a charm light world. Istanbul is one of the most important cultural, historical and commercial centers of the world. In the case study, historical and contemporary regions in Istanbul through the Bosphorus Strait will be discussed and analyzed considering lighting scheme as a “design tool” in the lighting master plan. Bosphorus region is selected for the lighting analyze because of having symbolic characteristics of the city. Lighting scheme will be analyzed according to the “holistic design approach”. From this point of view, lighting scheme must include all the components of outdoor urban environment, maximizing the value of the night and minimizing all potential adverse effects. The urban lighting conditions will be analyzed through a checklist and preferences of users will be evaluated through a questionnaire.

Key words: Light Mapping - Visual Culture - Image of the City - Urban Identity - Istanbul-Bosphorus

INTRODUCTION

City lighting influence people’s aesthetic perception, enhance the quality of people’s lives. At the same time, it can promote development of the city, enhance the reputation of the city, has the profound significance to politics, the economy and the culture. Good lighting design can display the culture and the characteristic of the city and build a charm light world.

Istanbul is one of the most important cultural, historical and commercial centers of the world. The city embraces two continents, one arm reaching out to Asia, the other to Europe. Istanbul is the former capital of three successive empires-Roman, Byzantine and Ottoman where one can see the remnants of the history.

In the study, as a case study, historical and contemporary regions in Istanbul through the Bosphorus Strait are discussed and analyzed considering lighting scheme as a “design tool” in the lighting master plan.

MATERIALS AND METHODS

Historical and contemporary masterpieces in Bosphorus Region are discussed and analyzed considering “lighting scheme” as a design tool in the “lighting master plan”. Lighting scheme is analyzed according to the “holistic design approach”. From this point of view, lighting scheme must include all the components of outdoor urban environment, maximizing the value of the night and minimizing all potential adverse effects. In the study, the urban lighting conditions, preferences of users are evaluated through a questionnaire.

Lighting Scheme Emphasizes Urban Identity: The term “identity” is commonly used in a number of disciplines concerned with the study of human behavior, conduct and societal structures in general. Lynch [1] defines identity as “the extent to which a person can recognize or recall a place as being distinct from other places”.

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Like individuals, cities should have character and distinctions; like individuals, this flavour is made up of numerous characteristics, or identifiable elements [2, 3]. Urban spaces created through urban design come along as determining and guiding parameters with respect to urban identity [4, 5].

Light in the city is necessary for orientation. Lighting makes it possible to distinguish streets, pats and parks and allows users of public spaces to see each other. The illumination of buildings, the lighting of objects and of green spots in the city can also serve to beautify the surroundings, providing it is done well. Lighting of outdoor spaces is an important criteria for the urban identity. Light is a design element. It has physical, psychophysical and aesthetical aspects. Light and color strongly affect the perceived image and identity of a space. Beyond the fundamentals of providing adequate vision, urban lighting can also serve as an organizer and a conveyer of spatial hierarchies while giving a visual identity to a city, so many cities worldwide are interested in the topic of night urban planning. This interest for public in general, was the base for social and architectural studies and for involving of lighting in urban studies. City lighting was seen more as functional and crime prevent lighting projects were based on “more lighting equals to more safety”. Starting from this point of view, a misunderstanding on terms and definitions of outdoor lighting happens today.

In spite of the architectural differences, during daytime we experience the city as a whole, because the daylight that is present throughout the city unities it in a natural way. However, the city light at night is determined by various of factors. Achieving a sense of unity at night, it is necessary to bring all the light into harmony as far as possible. The lighting in the city in the evening and at night must create a pleasant atmosphere, but should not dominate. When there are not many people on the streets, the surroundings must still be agreeable and not threatening. This holds the attention of visitors for longer, so they make more use of the city [6].

The purpose of city lighting is clearly to enhance citizen safety, security, to support business interest, to save energy and improve the city’s nighttime ambience, while minimizing light pollution (Figure 1) [7].

Lighting is highly visible and a positive nighttime image of the city can help enhance communication; social interaction, esthetical enhancing, visual comfort, safety and security. The goals of a city lightening plan are likely [8];

- to establish the city as a leader in sensitivity with its appearance and utility, at night as well as day and to insure recognition of its effective and efficient lighting of the public and private
- to create a greater sense of the vitality of the city at night, encouraging more frequent visits by residents and tourists

Urban lighting is the notion of “environment” as system of relations between subject and his space. It depends on our sensitivity, it is the result of our perception of space, difference between light and shadow, colour, of planting, movements and other things. Urban lighting and public lighting are, in fact, deeply different for the concept itself and for the way to face a lighting Project. Public lighting is seen more as functional lighting in outdoor environment, responding to technical parameters, while “urban lighting” is a multidisciplinary concept. In this study, urban lighting is discussed from various view points by the specially selected historical places on the Bosphorous Strait.

**Urban Lighting of Istanbul in the Context of Identity Through Light Mapping:** Culture affects the image of the city through spatial regeneration over time [9]. Istanbul is a bridge between the past and the present, invisible
powers of light energy, color are carried through years and this power is hidden in various historical buildings. A lighting scheme for the city need not address all areas or spaces. Especially Bosphorus Strait offers a delightful mixture of past and present. In the study it is aimed to introduce and analyze a conceptual lighting plan for Istanbul (Figure 2).

**Architectural Features:** It is necessary to study the historical background and architectural details. Historical peninsula, Galata-Pera, Uskudar presents historical heritage to the visitors, whereas Levent-Maslak region presents modern images. Architectural features affect the city silhouette, so while analysing the city, revealing basic architectural features is important. Historical and modern silhouette of the city during day and night can be seen in Figure 3.

In such cases, these differences must be evaluated perfectly. Silhouettes which take place at the certain view and within one sight, should be evaluated according to the lighting master plan of the city. The lighting design shall display a building or landscape as an object of interest and architectural or natural merit because of its function or age. A well designed lighting master plan is tailored to the individual character of the environment and create coherence in the nighttime appearance of the place. The art of floodlighting of such places usually depends upon illuminance variation to achieve its objectives. Floodlighting does not seek to imitate a daylight appearance, but rather to show the structure in a different but recognizable and attractive way. The night can certainly be a little more mysterious and have its own ambience. To this end it is important to realize that when displaying a building or a landscape designing, shadow is also important. Shadows created can be as important as the illuminated areas and therefore, in a way, the term floodlighting is in appropriate, since merely flooding a building with light produces a very uninteresting result.

**Hierarchy:** In case a great number of important buildings take place at the silhouette, their effective images must be analyzed from the near and far viewpoints (Figure 4). To make the building or monument more interesting, artistic use of light, shade and shadow or colour difference is necessary. Color and architecture go hand in hand. Color can not be delegated to second rank. Studies point out that once color is added to exteriors, more positive evaluations results, while the absence of color generally brings negative reaction.

The lighting plan shall be in accordance to the architectural identity of the building, its location in the community and the view of those who own the building, should be undertaken before an attempt at external lighting of a building is made (Figure 5). This is particularly true with regard to the colour of the light to be employed. Color design shall have three major rules to adhere to [10]:

- it supports the function of a building, the tasks that are being carried out in it
- it avoids overstimulation and understimulation. Buildings that exhibit the same or similar design can be given individuality through color detailing
- it does not create negative emotional and physiological effects. Color can modulate a building, bring it in harmony with its surroundings.
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<thead>
<tr>
<th>Monuments/Buildings in Day Time</th>
<th>Monuments/Buildings in Night Time</th>
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<tr>
<td><strong>Near Viewpoints</strong></td>
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<td><img src="image" alt="Near Viewpoints Day" /></td>
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<td><strong>Far Viewpoints</strong></td>
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<td><img src="image" alt="Far Viewpoints Day" /></td>
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Fig. 4: Hierarchy in Light Mapping

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<tr>
<th>Traditional Waterfront-Homes on the Bosphorus Strait</th>
<th>Lights in Istanbul</th>
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<tr>
<td><strong>Monuments on the Bosphorus Strait</strong></td>
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Fig. 5: Architectural Identity- Color-Lighting Scheme
Symbols: Elements which identify, associate, make marks on the image of a city are important for the lighting master plan of a city. These elements might be historical, unique, original structures or modern structures. Galata Tower, Bosphorus Bridges, Mosques, Palaces, Fortresses can be given as an example or Kız Kulesi is one of the most romantic symbols of Istanbul, too (Figure 6).
There is a temptation to use colored light to obtain a dramatic effect. This can be very successful, but only in very specific and appropriate circumstances. In general, a building usually benefits from the unifying effect of a single color of light or, occasionally, a subtle change of color by direction. It is the revealing power of light that should be harnessed in the scheme’s design. Light from a prominent direction can display a building very successfully by allowing the varying orientation of the building’s surfaces to create shadows in order to reveal its features [11].

**Viewing Points-Proximity:** In outdoor and architectural lighting, viewing directions of the observers also has to be kept in mind for the lighting master plan. Viewing points for the visitors or people passing by should be known to decide the aiming directions of the luminaires, while eliminating the glare. Facades shall be illuminated in a way to overcome flatness and being uninteresting. As far as possible, the direction of the lighting should not be from the same direction as the main direction of view of people looking at it. Architectural elements can be lit with differing densities of lighting that signify to the visitor places of greater and lesser importance.

**RESULTS AND DISCUSSION**

The study is supported by a questionnaire which investigates the visitors’ perception of the Bosphourus Region. A total of 290 visitors (180 female, 110 male) have participated the study. They evaluated the architectural features, hierarchy, symbols and the viewing points according to the day time and the night time vision. The arithmetical mean of the responses indicate that; 62% of the visitors believe the surrounding is not secure, they are disturbed during the nighttime, 50% of the visitors believe the lighting design is well designed from aesthetical point of view. When responses are grouped by means of the lighting design;

- 30% of the visitors believe that lighting fixtures are insufficient
- 12% of the visitors believe that there is no maintenance
- 7% of the visitors believe that there is glare
- 37% of the visitors believe that visual comfort conditions are not satisfied
- 14% of the visitors indicated “other conditions”

The study also comprises questions related to urban identity. According to the responses, it can be said that 47% state that historical buildings are the most determining factors during daytime, followed by bridges and landscape (17%), modern buildings and roads (9%). During nighttime these percentages changed as follows: 55% indicate that historical buildings are the most determining factors, followed by modern buildings (19%), bridges and roads (11%), landscape (4%). The results clearly show that lighting of the landscape at Bosphorus is insufficient at nighttime, whereas the effect of modern buildings and bridges on perception during daytime and nighttime are equal to each other (Figure 7).

**CONCLUSION**

The architectural features of a city include streets, squares, buildings, roads and bridges etc. These elements shape the city silhouette and identity. Improvement in the lighting technology provide new opportunities. Colored light makes the city resemble a theatrical scenery. Istanbul in this sense can be relighted by colored light according to the period of the construction.

In this study, historical and contemporary masterpieces in Istanbul are discussed and analyzed considering “lighting scheme” as a design tool in the “lighting master plan”. The present image of the city is analyzed together with the light mapping tool. In the transformation and interpretation of the historical identity to the city silhouette, light is used to formulate this idea. According to the results, there are three key factors for effective lighting at cities:
Lighting scheme must be sensitive to the character of the city and must address the needs of the city in a way that meets the city’s objectives.

The lighting scheme must include all the components of the outdoor urban environment, maximizing the value of the night lighting and minimizing all the potential adverse effects like light pollution

There is no need to light everything all night or at the same level during nighttime. The night can certainly be a little mysterious and have its own ambience, when a building is illuminated, the color and material of the surfaces have their own requirements for the type of light source. When illuminating buildings, reflectance of various materials, color and texture has to be considered.

REFERENCES