Direction of illumination system development in the XXI century in European Union

Artur Nawrowski*

*Faculty of Architecture, Poznan University of Technology, Nieszawska 13C Street, Poznan, Poland,
e-mail: Artur.Nawrowski@put.poznan.pl

Abstract **The article presents insights into the evolution of modern illumination systems. Emphasis was placed on the characterization of the three groups of issues currently existing in the illumination and having an impact on its evolution. The significance of the various factors affecting the quality of modern illumination. The publication summarizes the proposals for future direction of illumination in the twenty-first century in European Union.**

Keywords **Evolution of lighting, methodology of designing illumination systems, lighting equipment, urban planning, agglomeration Masterplan, European Union.**

I. INTRODUCTION

Illumination, which is the operation of engineering techniques bordering on light, architecture, urbanism, art, psychology and emotional experience - not a psychological phenomenon by the end of the audited. In the twenty-first century, the era of globalization and civilization problems facing the modern world, it seems reasonable need to redefine the purpose of illumination on the one hand, and explore new areas of its applications on the other.

Dynamic progress in many fields of science and technology leads to reflection on the role of illumination and the possibility of its application in the changing spatial conditions of an integrated Europe.

There are, according to the author, three basic factors determining the evolution directions of illumination systems in the twenty-first century.

II. EVOLUTION OF LIGHTING EQUIPMENT

Research and development of artificial light sources has forced changes in design methodology of modern lighting systems. On one hand, the possibility of implementing a specified spatial distribution of the luminous flux of luminaire contributes to the visual appeal of the proposed system in terms of performance parameters, photometric and colorimetric properties. On the other hand, progress in the design of lighting fixtures enhances the aesthetic appeal of lighting on the technical side. These factors directly affect the evolution of artificial light [4].

Important role in the development of illumination systems are working on development of LED. The possibility of their use such as road lighting and illumination makes it a particularly forward-looking source of light. Improving the performance of LEDs and the digitalization and computerization of the process control and diagnostics is part of a broad tendency to create intelligent, self-diagnosing lighting systems.

The future of illumination systems in this regard is dependent on the development of electronics and to further improve the electrical parameters, thermal, photometric, colorimetric and aesthetic of LED panels. Get any color of light and selected dynamically evolving distribution of luminance on faces illuminated object to inspire further research into digitally controlled LED matrix.

III. EVOLUTION OF METHODOLOGY OF DESIGNING ILLUMINATION SYSTEMS

With the development of lighting equipment and a wider implementation of modern information technology in the design of technical systems can be seen in the evolution of the design methodology of the external electric lighting. In the case of plants emerging, with all the complexity of the qualifications of the object, illumination design process may begin already in the phase of the architectural concept. This procedure allows more flexible on-going to the lights on the facade of the issues at each stage of the architectural concept and take into account the architectural space - light in a much broader context than just the facade illuminated object.

The growing ability of computer-aided design applications allow you to carry out multi-variant lighting colorful lights and three-dimensional simulation without the need for additional lighting scenes, which greatly simplifies the design process.

Cooperation of complex graphical environments used by architects and applications to support the process of lighting design today can work out a lot of different design concepts and a visual check their compatibility with the surrounding urban space.

Collective collaboration of architect and designer lighting sets the directions for the evolution of methods and techniques for creating the concept of illumination which gives the technical feasibility of developing a coherent urban agglomeration Masterplan. In the era of globalization, development of a concept Masterplan of lighting the city, which is a harmonious whole with the same time distinguishing the components of the illuminations in smaller cities that are in the vicinity of a large agglomeration, is a project task difficult but desirable [4]. An important factor in the construction of such a Masterplan, which is based on the illumination, it should be the study of physiognomy - scenic, historical analysis of its layers and aspects of lighting, cultural, social, economic and legal. Is it possible to develop a single cohesive Masterplan lighting of a united Europe

with all the complexities of developing such a system for agglomeration?
Today it seems to be a very distant prospect. However, it can bring a multi, international research.

IV. EVOLUTION OF ARCHITECTURE AND URBAN PLANNING

In today's world, in the era of globalization and increasing consumption of electricity while reducing the resources looking solutions to the aesthetic, ecological and energy efficient. This is apparent also in architecture and urbanism - the direct object the illumination - which are stepping up measures to encourage the emergence of a people friendly environment. One of the trends in the development of modern architecture is the evolution of bionic architecture, which is inspired by the flora and fauna [4].

Bionics, also known as Biomimetics (from Gr. bios - life and mimesis - to follow) is now one of the most important trends in design. In short, is to study the principles of functioning of living organisms and their adapting to technical systems. Applies to virtually every aspect of design, from small items of daily use (swimwear inspired by the skin of a shark-inspired shoes velcro hooks burdock), even large objects (eg cars inspired by the streamlined shapes of fish, such as Mercedes or Mercedes-Benz Bionic Car Biome).

Bionic architecture also creates a new field of research and application of artificial lighting systems, including illumination.

In fact, the bionic architecture seeks to create self-contained architectural form that meets the specific objectives and functions at the cost of its implementation and operation. By definition, should be a form of self-sufficient also in terms of supply of electricity, is also needed for lighting purposes.

Therefore, trends in architecture bionic illumination can go in the direction of electric lighting, "elevation" of objects based on renewable energy sources such phenomena, or photochemical, photovoltaic and others - such as nanotechnology.

The evolving architectural space is reflected in the methodology of research and analysis of space, as exemplified by the method of ZAP - An Integrated Analysis of the Comparative Method [1]. It concerns the ability to assess trends in the urban transformation and development of a sustainable city based on the dominant architectural features.

Information potential inherent in teams of architectural - town-planning seems to be fully documented the growth and ever-changing information space. The architectural teams are expressions of a variety of information: the historical, cultural, commercial and a universal character, because perceptually received by all people and having a considerable range of branch-eg induction. At night, this collection is conditioned wholly by artificial lighting.

ZAP is the gist of an attempt to determine the attractiveness of physiognomic small town, examining the nature and dominant cultural values of architecture, the location and spatial relations determining the order and sustainable development and commercial attractiveness, affecting competitiveness.

This is another aspect of the research [2] – [4] on the role of artificial lighting in shaping the image of public spaces in urban areas. A new feature of illumination can be reduced in this area to assess the development of a sustainable urban area at night, or even the deliberate exposure.

V. CONCLUSION

In light of the analysis of modern illumination systems [1] – [4], it seems that:

1. in architecture and urbanism, there is a clearly visible area on shaping the image of public space in terms of its architectural illumination. In relation to the contemporary urban realm is not fitted out by the end of,
2. change in design methodology is emerging architectural illumination twenty-first century, allowing for the planning of the stage of the architectural concept, which in a globalizing world and the simplification of design is undeniable advantage,
3. evolution is the subject of illumination - architecture and urban planning, more and more inclined toward energy-saving solutions and intelligent, inspired by nature, therefore, it is noted increased interest in bionic architecture, where the role of illumination lighting is not yet defined,
4. informational message issued by the dominant architecture, could become a basis for decisions on allowable spatial transformations affecting the planning of public spaces with electric lights,
5. there is objective evidence and the technical possibility of creating a legal and theoretical foundations for the construction of the urban agglomeration Masterplan lighting on a European scale, taking into account the dynamics of this phenomenon and illumination as one of the most important factors.

VI. REFERENCES

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