Igor Gojnik

Dnevno svjetlo kao čimbenik arhitektonike i identiteta prostora – metoda dnevnosvjetlosne analize

Doktorska disertacija [sažetak]

Daylight as Factor of Architectonic and Identity of Space – Qualitative Daylight Method

Doctoral Dissertation [Summary]

The daylight in architecture can be observed from a quantitative and qualitative point of view. Theory and practice of quantitative daylight analysis in architecture have predominant focus on determining illumination values, sunshine and protection of glare in accordance with the physiological and psychological needs of users of space. They have been the subject of scientific research in the field of daylight science for over a century and have reached a satisfactory level of development and usability in architectural design process. The development of a dynamic climate-based quantitative analysis method and the development of physically accurate simulation methods of daylight and architectural space in the past ten years have enabled significant advances in modeling physically exact daylight indicators for a architectural space in the climatic data framework that is based on the concept of a typical meteorological year. In addition, the development of computers enabled the implementation of very complex light transport simulation analyzes within a practical architectural design process, which obtains precise quantitative daylight indicators for the designed space.

But apart from quantitative indicators, architects have always highly valued the qualitative aspect of the daylight phenomenon in the context of the potential of daylight as an intangible factor of architectural and space identity in the artistic sense.

If it is predicted in the early conceptual phase of architectural design, the interplay of daylight flow with architectural geometry and materials creates a separate intangible architectural layer that often determines the compositional and symbolic power of architectural space.

Unlike quantitative point of view, theories and methods for the practical implementation of qualitative daylight analysis are very poorly developed, and the qualitative daylight metrics developed so far, predominantly point to a subjective evaluation of built space. There is no theoretical framework and practical analytical method that has been proposed for quantification of qualitative indicators of the interaction between the daylight flow and the architectural space.

The doctoral dissertation poses the hypothesis that it is possible to develop the theoretical framework and practical method for conducting qualitative daylight analysis in the architectural design process and, on the basis of the latest scientific knowledge and available methods in the field of dynamic climate-based quantitative analysis, it proposes a new method of qualitative daylight analysis DSK.DO – dynamic stability and the contrast of daylight objects. The proposed method is based on the quantification of the design determined qualitative daylight configuration in the architectural space. The relevant daylight configuration determines the contrasting relationships and the internal illumination stability of daylight objects as the basic building blocks of daylight configuration in the space.

The aim of the implementation of the method is the realization of a designed daylight concept based on the realization of the relevant daylight configuration within the projected time interval of the year. The research proposes a theoretical framework and a practical method for conducting qualitative daylight analyses with the aim of realizing a of planned daylight concept in the architectural space. Since the proposed method is based on numerical methods and computer-based analysis it has been developed a computer application that is fully aligned with the theoretical framework of method and enables analyses in a practical architectural design process.

[Translated by author]

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Na temelju najnovijih znanstvenih spoznaja i dostupnih metoda iz područja dinamičke, klimatski utemeljene kvantitativne analize ovom se disertacijom predlaže nova metoda kvalitativne dnevnosvjetlosne analize DSK.DO – dinamička stabilnost i kontrast dnevnosvjetlosnih objekata. Istraživanje predlaže teorijski okvir i praktičnu metodu za provođenje kvalitativne dnevnosvjetlosne analize s ciljem realizacije projektantski postavljenoga dnevnosvjetlosnog koncepta u arhitektonskom prostoru. Istraživanjem je razvijena računalna aplikacija koja je u cijelosti usklađena s teorijskim postavkama metode i omogucuje provođenje analize u praktičnom arhitektonskom projektantskom procesu.