KRZYSZTOF SKARŻYŃSKI

Lighting Division
Institute of Electrical Power Engineering
Faculty of Electrical Engineering
Warsaw University of Technology
Koszykowa 75, 00-662 Warszawa

FLOODLIGHTING OF ARCHITECURAL OBJECTS AND ENVIRONMENTAL LIGHT POLLUTION

Summary

The first electrical light sources were invented 150 years ago. Ensuing fast development of such light sources was stimulated by perspective of possible brightening of the darkness of night. The expansion of the range of usefulness of light sources then followed, from interior to external sites – such as streets, parks, stadiums, and buildings (known as floodlighting). If such lighting applications are used in the wrong way, an increase in brightness of the night sky is caused, and the expansion of a new biological threat occurs – the phenomenon of light pollution.

A steep increase in the development of research connected with the energy efficiency of lighting has recently been clearly noticed. Statements of special laws and engineering calculations have been created. in order to define whether or not lighting installations are sufficiently saving electrical energy. Originally, this research was directed at interior lighting only, but currently it is also directed towards the lighting of external sites. It is worth noting that so far it does not concern floodlighting.

The experience with lighting designs shows that, in the case of floodlighting, most luminous flux is sent directly up into the sky or into the space closest to the building being illuminated. This fact is very disadvantageous. The need to use artificial light in a reasonable way will be demonstrated. Projects and lighting installations should be optimized, not only with regard to aesthetics, but also with regard to luminous flux losses (and the resulting energy losses and light pollution).

The main aim of this work is to highlight the issue of the adequate design of illuminations from ecological point of view. An experimental method for evaluating this problem is proposed based on the definition of a new parameter – floodlighting efficiency. The results of research, analyses and calculations due to different lighting methods and applications are also described.