

POLITECNICO DI TORINO
SECOND SCHOOL OF ARCHITECTURE
Master of Science in Architecture
Honors theses

**AN ARCHITECTURE AS AN EXPERIENCE OF LIGHT – design for the
International Velux Award 2010**

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General south view of the museum

The thesis refers to the participation to the International Velux Award competition organised by Velux in cooperation with UIA (International Union of Architects) and with the l'EAAE (European Association of Architectural Education) which is addressed to all students of the Faculty of Architecture. The theme of the competition, entitled "Light of Tomorrow", focuses on the complex relationships between architecture and natural light and does not impose morphological, contextual and technological constraints, leaving a great "freedom" in facing the theme.

The thesis is composed of three main parts: a first part dealing with historical analysis of the complex relationships between natural light and architecture, highlighting the different ways architects have interpreted the topic of the natural light; a second part describing the process that led to the development of a concept design for the competition and its carrying out; and finally the last part was devoted to lighting and energy checks related to the environmental and covering materials characteristics of the designed building.

The design concept is based on the working principle of a dark room reinterpreting it with light. As well as the **dark rooms** were utilized by some great ancient painters for fixing images that was later reproduced, than the main idea of the thesis was to create special rooms capturing and blocking environmental light effects in relation to six main topics related to the architecture: light and space, light and movement, light and reflections, light and time, light and colors, light and energy.



Some “snap-shots” of light inside the designed modules

To achieve a uniform visual comparison among the different sensations and atmospheres created by the light, has been studied “ad hoc” modular structure able to guarantee a high assembling flexibility and dynamism of use. In this sense have been thought two main possible kinds of museums: the first kind deals with temporary aggregations, different among them by shape, able to be easily used for temporary exhibitions and events light related, locating it in town squares and parks. In this case the number of modules linked to the light is limited.

The second kind, is based on a more complex building that, correctly oriented, is able to create a sequence of light effects, in which the path inside the exhibition rooms, the services and the different environments, becomes a real **“experience of light”** for each visitor. In this path is the natural light own becoming the main subject, assuming the role of the main exposition subject, capsizing the typical function of the light inside the museum spaces.

The last thesis part has dealt with some design analysis, simulations and verifications estimating the lighting technique and energy levels. Specifically, the lighting technique calculations has been focused on the evaluation of the rooms lighting levels, using static and dynamic parameters, and the part of artificial light necessary to integrate the natural light. In this way it was possible to estimate in a precise way the total electrical energy needs, previously calculated using estimations referred to typical consumption values.

The results as been used to correctly dimensioning the photovoltaic system installed on the roof, in order to keep the building self-sufficient in relation to the artificial light needs.



Internal view of an exhibition room at the last floor of the museum

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