Ain Shams University
Faculty of Engineering
Department of Architecture

Top Lighting for Enhancing Daylighting Performance in Drawing Studios

A thesis Presented in Partial Fulfillment of the Requirements for
Master of Science Degree in Architecture Engineering

Submitted by

Heba Elsayed Ahmed Mohamed Omaraa

BSc in Architecture 2013- Kafrelsheikh University

Under supervision of

Prof. Dr. Mostafa Refat Ismail
Professor - Department of Architecture
Faculty of Engineering – Ain Shams University

Assoc. Prof. Dr. Ashraf Ali Nessim
Assistant Professor – Department of Architecture
Faculty of Engineering – Ain Shams University

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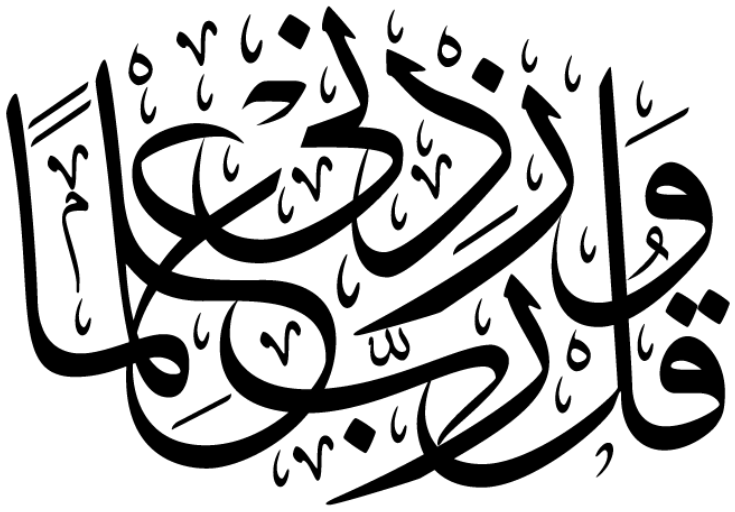
وقل رب زدني علما

Ain Shams University
Faculty of Engineering
Department of Architecture Engineering

Name: **Heba Elsayed Ahmed Mohamed Omaraa**

Title : **Top Lighting for Enhancing Daylighting Performance in Drawing Studios**

Degree: **Master of Science Degree in Architecture**

The Jury Committee:

Prof. Dr. Ahmed Ahmed Fekry

Professor - Department of Architecture

Faculty of Engineering – Cairo University

Prof. Dr. Khaled Mohamed Dewidar

Professor - Department of Architecture

Faculty of Engineering - Ain Shams University

Prof. Dr. Mostafa Refat Ismail

Professor - Department of Architecture

Faculty of Engineering – Ain Shams University

Post Graduate studies

Approval stamp

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The Research was approved on

…./……/….

Faculty Council Approval:

…/…./….

University Council Approval:

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Disclaimer

This thesis is submitted as partial fulfillment of M.Sc. degree in Architecture, Faculty of Engineering, Ain Shams University.

The work included in this thesis was carried out by the author during the period from May 2017 to September 2020, and no part of it has been submitted for a degree or qualification at any other scientific entity.

The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

Name: Heba Elsayed Ahmed Mohamed Omaraa

Signature:

Date:

Ain Shams University
Faculty of Engineering
Department of Architecture Engineering

Examiners Committee

Submitted by: Heba Elsayed Ahmed Mohamed Omaraa.

Thesis Title: Top Lighting for Enhancing Daylighting Performance in Drawing Studios

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The Jury Committee:	Signature
Prof. Dr. Ahmed Ahmed Fekry Professor of Architecture- Architecture Department Faculty of Engineering-Cairo University	
Prof. Dr. Khaled Mohamed Dewidar. Professor of Architecture- Architecture Department Faculty of Engineering- Ain Shams University	
Prof. Dr. Mostafa Refat Ismail Professor of Architecture and Environmental Control Ain Shams University	

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Abstract

Daylighting strategies are one of the most common aspects of architecture, but their proper use was ignored by the designers during the implementation of the buildings which led to the lack of a good distribution of the natural lighting within the deep spaces. They find a lot of spaces have many windows and the absence of any external obstacles to entering the daylighting inside the space. But it has found some areas still dark, and this is not accepted in IES; Due to the availability of cheap electricity at the time, the main dependence on space lighting was achieved by using the non-regulated electricity which led to the rapid increase in For this purpose, this research paper aims at activating the use of lighting strategies in educational establishments, especially the drawing rooms, which needs to be equipped with regular lighting, and for long periods, to maintain the visual comfort of the application and rationalize the use of electricity using the techniques of the daylighting for the regular distribution of lighting.

In chapter one, an emphasis was on the importance of daylight lighting and its relation to the regional climate and the most important systems used to provide daylighting into space while saving thermal comfort, especially in educational buildings and the extent of the relation of providing a good visual environment with student productivity have been reviewed with mentioning some of the educational buildings that have used top lighting systems.

In chapter two, the top daylighting Characteristics, types of daylighting, the most important systems, and unilateral or multilateral daylighting strategies that should be applied in the stage of the conceptual design of a building and show Types of Top lighting Shading Techniques.

In chapter three, show the definitions Daylighting Metric describe Parameters Base Case and follow Simulation Methodology from Simulation Inputs and Analysis of Software Simulation Tool and Design Variants, 3D Parametric Models, Weather Data, Occupancy Schedule and finally Simulation Outputs as a result to sDA (Spatial Day Light Autonomy) and ASE (annual sunlight exposure) for choose accepted case was closed to IES criteria

In chapter four, show the concept of designing shading technique and mention types of the shading systems to focused on shading techniques simulation methodology for treatment the chosen case to achieve the accepted criteria well light for visual comfort.

The last chapter introduced the conclusions and recommendations. With the possibility of re-designing the natural lighting of the space established; to enhance the internal lighting and achieved the required levels for daylighting. At last, future research concerned with optimization studies for building design was suggested.

Acronyms / appendix

ASE: Annual Sunlight Exposure.

sDA: Spatial Day Light Autonomy.

GP: Glare Probability.

DF: Day Light Factor.

IES: Illuminating Engineering Society.

ASHRAE90.1: American Society of Heating, Refrigerating and Air-Conditioning Engineers

NE: North East.

NW: North West.

SE: South East.

SW: South West.