Daylighting in Catholic Churches

A Study of Nairobi

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DECLARATION

This thesis is my original work and has not been presented in any other university or institution for the purpose of awarding a degree to the best of my knowledge.

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This thesis is submitted in part fulfillment of the examination requirements for the award of Bachelor of Architecture degree (B. Arch), Department of Architecture and Building Science, University of Nairobi.

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ABSTRACT

Light and shadow are used in architecture to create solids and emptiness. Since the beginning of architectural history light and space have interacted. This interaction is a reflection of the dynamics of design shaped by geographical conditions, social structure, beliefs, religion, economics and politics. Light is also used to create psychological and physiological effects in architecture. Daylight symbolized the God in almost every culture. This phenomenon shaped the interior illumination of the religious buildings.

In religious spaces, the design of space and lighting changes according to worship and liturgy. The desired lighting design varies according to religions and sects. The quantity and quality of illumination along with the combination of lighting, color and shadow affects the quality of the sacred space and the overall spiritual and mystical balance. This study deals with daylight of religious spaces that reveals the interaction between beliefs, political, social and aesthetic values and the technological possibilities. The study explains how the daylight provides identity to the religious spaces.
CHAPTER 1: INTRODUCTION
1.1 Introduction

*Genesis 1:1-5 (NIV)* - “In the beginning God created the heavens and the earth. Now the earth was formless and empty, darkness was over the surface of the deep, and the Spirit of God was hovering over the waters. And God said, “Let there be light,” and there was light. God saw that the light was good, and he separated the light from the darkness. God called the light “day,” and the darkness he called “night.” And there was evening, and there was morning—the first day.”

Light gives character to architecture. Its absence denies humans the ability to experience and comprehend form, color and texture. It is able to transform spaces, evoke emotions and sensations and also accentuate and highlight elements of space to capture the viewer’s attention.

In sacred buildings, light is not only used for the necessary visual comfort, but most importantly, to evoke mystical and spiritual feelings. It is used to create ‘divine’ spaces and is identified with the creator, and the spaces emphasize the glory of God. In sacred spaces, the space and lighting design changes according to liturgy. Each space requires different lighting for different functions and moods.

The quantity and quality of light combined with the colors and shadows affects the quality of the space and the spiritual and mystical feeling. Therefore, the hypothesis of this study is that, in sacred buildings, the perceptual quality and dimension of light is of more importance than visual comfort and clarity and that various elements and aspects of space may emphasize this dimension.
1.2 Background Study

The history of church architecture is quite rich and religious buildings have evolved in design, both form, layout and use. New churches continue to be built with various forms, some simple and minimalistic, and others complex and detailed.

As for the Catholic Church, the evolution is quite evident especially after the Second Vatican Council. New forms and layouts to encourage “active participation” have emerged. It is also evident that new churches are being designed with an objective to fit into the local context. For example, in Kenya, churches like Don Bosco Shrine in Upper Hill, Nairobi, were designed to fit into the African context. More Catholic churches are also being built in order to accommodate the growing Catholic population.

Design of churches requires sensitivity to both the context and the emotions evoked by the building, that is, contemplation, meditation and worship of God. Light is a very crucial element that contributes to this psychological effect, therefore, it must be used and manipulated innovatively to achieve a sacred environment.
1.3 Problem Statement

"...Light is the origin of all being...Light grants autonomy to things and, at the same time, prescribe their relationships...Light: the creator of relationships that constitute the world; yet although the origin of all being, it is by no means an immobile source. Light is, rather, tremulous motion - out of its ceaseless transformation, light continually reinvents the world... “(Dalco 1996)

Various architects propose to either use representational symbolism, traditional/ regional form or hierarchy of spaces as design elements. Others propose the manipulation and play of natural light and the abstract ideas of design. Both techniques aim at creating meaningful religious spaces. Despite this, the latter are frustrated by the former’s clinging to traditional ways of thinking, that is, conservative ideologies. Catholics believe in the binding of body and soul together, therefore representational symbolism expressing personal stories of real lives are very essential to the creation of religious space. Thus, the above mentioned techniques should be merged.

Light, being a very important element in sacred architecture, can be manipulated to add dynamism and create a divine environment for worship. Various catholic churches that are being built recently seemingly focus on lighting for visual comfort or as an afterthought, neglecting the psychological aspect.

Through this study, the author intends to show how natural light can be used and manipulated in religious spaces (with focus on Catholic churches) to create a special religious and divine atmosphere which is so frequently desired but rarely achieved in modern church buildings.
1.4 Research Objectives

1. To understand the history and evolution of daylighting in the design of Catholic Churches.
2. To investigate daylighting strategies that have been employed in Catholic Church architecture.
3. To identify ways in which innovative and modern daylighting strategies can be incorporated into Catholic Church design.

1.5 Research Questions

1. What is the history of daylighting and how has it evolved over time in the design of Catholic Churches?
2. What daylighting strategies have been employed in Catholic Church architecture?
3. In what ways can innovative and modern daylighting strategies be incorporated into Catholic Church design?

1.6 Justification of Study

Churches serve as places of worship and they ought to be meaningful and valuable in terms of the liturgy. At the same time, they are supposed to create an environment suitable for worship, that is, the proper mood for contemplation and prayer.

Lighting in architecture plays a very major role in influencing the users’ moods and evoking various emotions. Previous research on daylighting has focused majorly on other building types without necessarily addressing the psychological aspect.
This calls for an understanding of the various ways to achieve day lighting in Catholic churches, not just for functional purposes, but also attempt to connect humans to the divine nature of God.

This will be checked against successful church designs that have achieved the creation of a contemplative worship space.

### 1.7 Significance of Study

There is need to explore and highlight the importance of natural lighting within religious spaces. The author will highlight daylighting strategies that can be used in the design of Catholic churches.

The findings from this research will help designers to better design Catholic Church spaces using day light, therefore creating a meaningful religious space which evoke contemplation and divinity.

### 1.8 Scope and Limitations

This study will focus on daylighting analysis in sacred spaces, specifically Catholic churches in Nairobi. It will be limited within Nairobi city because amongst the 4 Archdiocese in Kenya (Nairobi, Kisumu, Mombasa and Nyeri), Nairobi has the largest population of Catholics.

It is also the Archdiocese with the highest number of parishes, which therefore provides a bigger selection range for cases to study and analyze. The analysis will be limited only to the main sanctuary spaces in the churches.
1.9 Organization of Study

Chapter 1 describes the problem statement, research questions and objectives, significance and justification, and limitations of the study. It also explains the existing state of catholic churches and recent design trends.

Chapter 2 focuses on the existing knowledge regarding daylighting of sacred spaces. This chapter aims at exploring and understanding daylighting strategies which will be eventually used to generate variables. These variables will guide the author to analyze the selected case studies.

Chapter 3 describes the methods selected to conduct this research. It will evaluate the research objectives and discuss the strategies that helped the author analyze daylighting in Catholic churches. The study requires analysis within a case study context.

Chapter 4 is a fieldwork investigation of the case studies selected according to the criteria discussed in Chapter 2. The findings will be analyzed and compared in order to make conclusions and recommendations.

Chapter 5 summarizes and concludes the research. It will give conclusions and design recommendations regarding daylighting in Catholic churches based on the findings in fieldwork analysis.