

**APPLICATION OF PASSIVE COOLING COMPONENTS IN THE DESIGN OF A  
SHOPPING MALL IN IBADAN, NIGERIA**

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(19PCA02006)**

**SEPTEMBER, 2021**

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SHOPPING MALL IN IBADAN, NIGERIA**

**BY**

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**A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES IN  
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF  
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OF ARCHITECTURE, COLLEGE OF SCIENCE AND TECHNOLOGY, COVENANT  
UNIVERSITY.**

**SEPTEMBER, 2021**

## ACCEPTANCE

This is to attest that this dissertation is accepted in partial fulfillment of the requirements for the award of the degree of Master of Sciences in the Department of Architecture, College of Science and Technology, Covenant University, Ota, Nigeria.

**Mr. John A. Philip**

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## **DECLARATION**

I, **OYELAMI, BLESSING JOHN (19PCA2006)** declares that this research was carried out by me under the supervision of Dr. Oladunni O. Izobo-Martins, in the Department of Architecture, Covenant University, Ota, Nigeria. I attest that this dissertation has not been presented, either wholly or partially, for the award of any degree elsewhere. All sources of data and scholarly information used in this dissertation were duly acknowledged.

**Oyelami, Blessing John**

**Signature & Date**

## **CERTIFICATION**

We certify that this dissertation titled “**APPLICATION OF PASSIVE COOLING COMPONENTS IN THE DESIGN OF A SHOPPING MALL, IBADAN**” is an original research work carried out by Oyelami, Blessing John (19PCA02006) in the Department of Architecture, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria under the supervision of Dr. Oladunni O. Izobo-Martins. We have examined and found this work acceptable as part of the requirements for the award of Master of Science in Architecture.

**Dr. Oladunni O. Izobo-Martins**

.....

Supervisor

Signature & Date

**Prof. Akunnaya P. Opoko**

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## **DEDICATION**

This thesis is dedicated to the Alpha and Omega, the only wise God who has given me the strength to complete the programme. Secondly, to my parents, Mr. and Mrs. Oyelami for their sacrifices and words of encouragements up till this stage. Thanks, Mum and Dad, for always being there. Lastly to my brother his support and motivation, God bless you abundantly.

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## **ABSTRACT**

It is important that buildings, especially public buildings are designed in ways that are energy efficient and provide thermal comfort for users. This study aims to design a shopping mall in Ibadan by adopting passive cooling design features towards achieving optimum indoor thermal comfort for users. The objectives of the study were to; investigate the existing passive cooling strategies that can be applied to achieve indoor thermal comfort in shopping malls; investigate the reasons for more usage of mechanical system in comparison with passive approach in shopping malls; investigate existing passive cooling features as it exists in selected shopping malls and design an energy efficient shopping mall that would optimize indoor thermal comfort by incorporating passive cooling components. The research was conducted by both quantitative and qualitative methods. The data collection instruments include questionnaires and observation schedules. Data was collected across four selected Shopping malls in Lagos, Ogun and Oyo State, Nigeria. A total of 79 questionnaires were distributed while 78 were retrieved. Two of the retrieved questionnaires were invalid and 76 were subsequently used in the analyses. Data was analyzed using the descriptive statistical tools of frequency and percentages of the Statistical Product for Services and Solutions (SPSS) and presented using tables and pictures. Data collected includes primary and secondary data. This study identifies the best practices through which passive cooling features can be used to improve the indoor thermal comfort of users in a shopping mall. The findings from this study also shows that poor air flow can be mitigated by incorporating passive cooling features like natural ventilation and green landscape in a shopping mall design. Furthermore, it was found out generally that some Shopping malls did not adopt passive cooling features in their design. It was also discovered that the benefit of passive cooling features translates into more cost-efficient ways of operating a shopping mall and reduces its life cycle cost, which leads to energy efficiency.

**Keywords: Passive Cooling, Sustainable Design, Energy Efficiency, Shopping Mall & Ibadan**