INVESTIGATING LIGHT LEVEL ON THE PERCEPTIONS OF OPTIMAL ILLUMINANCE: ENHANCING WORKPLACE COMFORT FOR OCCUPANTS IN SRI LANKA

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Degree of Master of Science in Electrical Installations

Department of Electrical Engineering

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Dissertation submitted in partial fulfillment of the requirements for the degree

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DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other University or Institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text. I retain the right to use this content in whole or part in future works (such as articles or books).

Signature: Date:

N. P. J. Senarathna

The above candidate has carried out research for the Masters dissertation under my supervision. I confirm that the declaration made above by the student is true and correct.

Signature of the Supervisor: Date:

Prof. W. D. A. S. Rodrigo

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ABSTRACT

The recommended illuminance level values applicable for Sri Lanka are specified in the 'Energy Efficiency Building Code of Sri Lanka', published in 2021. These illuminance level values were obtained from the 'CIBSE code of interior lighting', published in the United Kingdom in 1994. Considering the differences in the climate, culture, technology, economy etc. in the United Kingdom and Sri Lanka, developing and implementing illuminance level recommendations specifically for Sri Lanka could improve the comfort, performance, health etc. of the occupants.

For the general offices, the optimum illuminance level for Sri Lanka has been identified as 300 lx considering the performance, while the recommended illuminance level at present is 500 lx. Among the other aspects which are to be considered to develop an illuminance level recommendation, this study focuses on deriving the most accepted illuminance level for general offices, based on the perception of the occupants.

A survey was conducted to obtain the perception on available illuminance levels and illuminance measurements. The average of the available illuminance levels was 297.71 lx. Only 10.18% of the readings complied with the recommended illuminance level. The most accepted illuminance level based on the perception was derived to be 255 lx. These results were verified by conducting the same study for a sample of employees who work in laboratories, since the recommended illuminance level for laboratories is the same as for offices.

Further, the calculations revealed that the installation cost and energy cost for the most accepted illuminance level are 50% less than the cost for the recommended illuminance level.

The method used in this study to obtain the most accepted illuminance level for the occupants of the offices is suggested to be extended to other types of workplaces in developing recommended illuminance level values considering the Sri Lankan context.

Keywords: Perception on illuminance, Workplace comfort, Illuminance level recommendations for Sri Lanka

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LIST OF ABBREVIATIONS

Abbreviation	Description
ANSI	American National Standards Institute
BS	British Standards
CIBSE	Chartered Institution of Building Services Engineers
DIN	Deutsches Institut für Normung (The German Institute for Standardization)
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
LED	Light-emitting diode
SLL	Society of Light and Lighting
SLSCO	Sri Lanka Standard Classification of Occupation

LIST OF APPENDICES