FIELD ASSESSMENT FOR INITIAL PREPARATION OF NET ZERO BUILDING CERTIFICATION FOR THE UNIVERSITAS MULTIMEDIA NUSANTARA (UMN) BUILDING: A CASE STUDY ON VISUAL COMFORT IN C AND D TOWER

MBKM REPORT

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ENGINEERING PHYSICS STUDY PROGRAM

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TANGERANG

2024

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2
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PREFACE

With all the praise and thanks to Almighty God who has given his love and mercy so that the thesis titled "Field Assessment for Initial Preparation of Net Zero Building Certification for UMN's Building: Case Study Visual Comfort in C and D Tower" can be finished well. This thesis is written as the requirement for MBKM Project also serving as the initial preparation towards Net Zero Building Certification for UMN's building C and D Tower with the intention to be published as a scientitic articles. It is undoubted that without the support and help from related parties, this paper would not be done.

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Tangerang, 20 May 2024

Nicholas Pranata

PENILAIAN LAPANGAN SEBAGAI PERSIAPAN SERTIFIKASI NET ZERO BUILDING PADA BANGUNAN UNIVERSITAS MULTIMEDIA NUSANTARA (UMN): STUDI KASUS KENYAMANAN VISUAL PADA GEDUNG C DAN D

Nicholas Pranata

ABSTRAK

Untuk memastikan kenyamanan fisik yang optimal, dibutuhkan evaluasi komprehensif terhadap kinerja sistem bangunan. Penelitian ini bertujuan untuk meneliti dengan cermat menggunakan pengukuran sistem pencahayaan khususnya pada iluminasi dan *light power density* untuk semua pembagian periode (pagi, siang, sore, dan malam), serta dinamika akan presensi dari pencahayaan alami dan pencahayaan buatan pada Gedung C dan D Universitas Multimedia Nusantara (UMN) sebagai bangunan yang perlu ditelusuri sebab mengaplikasikan *double skin facade*. Temuan empiris dari penelitian ini menunjukan tingkat pencahayaan di dalam ruang kelas dan kantor, terlepas dari pencahayaan alami atau buatan, secara konsisten tidak memenuhi ambang batas 350 lux pada hampir seluruh lantai. Efektivitas dari *double skin facade* menunjukkan atenuasi secara jelas dengan mengurangi masuknya cahaya ke bangunan sekitar 50%, dan secara drastis hingga 90% dengan tambahan jendela. Selanjutnya, analisis *light power density* menunjukkan efisiensi energi kurang lebih 60%. Temuan empiris ini dimaksudkan sebagai referensi atau dasar untuk memandu pada bentuk usaha yang berfokus pada sertifikasi Net Zero Healthy Greenship.

Kata kunci: sistem pencahayaan; illuminasi; *light power density*; *double skin facade*; Net Zero Healthy

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ABSTRACT

Ensuring optimal physical comfort, the need for a comprehensive evaluation of the performance of building systems was established. This investigation endeavors to meticulously scrutinize lighting systems, specifically for illuminance and light power density metrics across distinct temporal segments (morning, noon, afternoon, and night), as well as the dynamism of daylighting and artificial lighting presence within Tower C and D of Universitas Multimedia Nusantara (UMN). Noteworthy for their incorporation of double skin facade , these edifices serve as focal points of inquiry. The empirical findings reveal that illuminance levels within classrooms and offices, irrespective of natural or artificial lighting, consistently fall short of the prescribed 350 lux threshold based on SNI across most floor levels. In addition, other room types resulted with similar outcomes. The efficacy of the double skin facade manifests in a discernible attenuation, diminishing illuminance ingress to the building by approximately 50%, and precipitously by up to 90% about window fixtures. Furthermore, the analysis of light power density underscores an energy efficiency quotient hovering around 60%. These empirical insights are intended to serve as a foundational resource for guiding the initiation of Net Zero Healthy Greenship certification endeavors.

Keywords*:* lighting systems; illuminance; light power density; double skin facade; Net Zero Healthy

TABLE OF CONTENT

LIST OF TABLES

LIST OF PICTURES

LIST OF APPENDICES