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DAYLIGHT FACTOR MAXIMIZATION FOR INDOOR COMFORT IN TEMPERATE CONTINENTAL CLIMATE ANALYTICAL COMPARISON BETWEEN TWO OFFICE BUILDINGS

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Abstract

This study examines two office buildings located in the temperate continental climate of Iași and Suceava, analysing their implementation of Nearly Zero Energy Building (NZEB) design principles from an integrated perspective. NZEB principles aim to optimize the annual duration of indoor comfort through architectural envelope designs that comprehensively address the four primary comfort domains: thermal regulation, air quality management, visual conditions, and acoustic performance.
For this paper, the research methodology employs passive design principles with particular emphasis on daylight factor optimization. Using DIALux evo software, one of the most commonly used software programs among electrical lighting designers, various lighting scenarios were simulated for both buildings
The analysis reveals significant differences in visual comfort outcomes between the two case studies, which can be attributed to their fundamental differences in development context—one being a new construction and the other a façade rehabilitation of an existing structure, that correlate directly with the varying opaque-to-glazed ratios present in the building façades.
The research findings emphasize how important it is to maximize natural daylight in building designs to decrease dependence on artificial lighting, reducing both energy consumption and costs. The relationship between daylight factor and indoor activities needs to be examined to determine the effectiveness of an optimal lighting design. Integrating this kind of analysis into architectural practice is essential for refining lighting strategies prior to their implementation. Conducting a daylight factor assessment during the early design phase is key to maximizing potential energy savings down the line.

Key words: climate model, daylight factor, indoor visual comfort, NZEB design, passive strategies

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