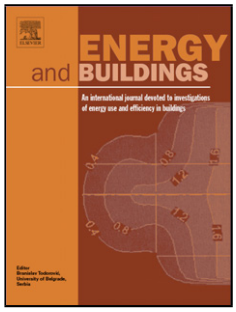

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Predicting Visual Comfort in Side-lit Open-Plan Core Zones : Results of a Field Study Pairing High Dynamic Range Images with Subjective Responses

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Abstract

Transmitting sufficient daylight to core zones while maintaining a visually comfortable work environment is critical for the effective use of daylight to reduce lighting energy and enhance indoor environmental quality. Although a range of indicators exists to predict visual comfort from windows, data comparing indicators with occupant subjective data collected from the core zones of daylit buildings are limited. This paper presents results from a study conducted in the core zones of a side-lit office building located in San Francisco, California. Subjective measurements of visual comfort were collected using a repeated-measures study design involving (N=14) participants over two weeks under clear sky conditions. Desktop polling devices were used to pair subjective data with concurrent luminance measurements acquired from High Dynamic Range (HDR) imaging cameras, resulting in a total of 523 observations. Single-variable logistic regression models generated from paired physical and subjective data were used to examine and rank 15 indicators of visual discomfort. Discomfort indicators based on luminance contrast ratios and absolute measures were found to be more effective than glare metrics or the more basic measures of vertical or horizontal illuminance. Results are compared and discussed in context with existing guidance for measuring and assessing discomfort glare.

KEYWORDS: Glare, High Dynamic Range Imaging, Post Occupancy Evaluation, Daylighting, High-performance Buildings