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A Comparative Assessment of Daylighting Metrics Assessing the Daylighting Performance of Three Shading Devices under Four Different Orientations

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Abstract : The assessment of the daylighting performance of a design solution is a complex task due to the changing nature of daylight. A few quantitative metrics are available to designers to assess such a performance, among them are the mean hourly illuminance (MHI), the daylight factor (DF), the daylight autonomy (DA) and the useful daylight illuminance (UDI). Each of these metrics has criteria and limitations that affect the outcome of the evaluation. When to use one metric instead of another depends largely on the design goals to be achieved. Using Design Iterate Validate Adapt (DIVA) daylighting simulation program we set out to examine the performance behavior of these four metrics with the changing dimensions of three shading devices: a horizontal overhang, a horizontal louver system, and a vertical louver system, and compare their performance behavior as the orientation of the window changes. The context is a classroom of a prototypical elementary school in South Korea. Our results indicate that not all four metrics behave similarly as we vary the size of each shading device and as orientations changes. The UDI is the metric that leads to outcome most different than the other three metrics. Our conclusion is that not all daylighting metrics lead to the same conclusions and that it is important to use the metric that corresponds to the specific goals and objectives of the daylighting solution.

Keywords : daylight factor, hourly daylight illuminance, daylight autonomy, useful daylight illuminance
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