Abstract

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Use of Kinetic Facades to Enhanced Daylight Performance in Office Buildings with Emphasis on Egypt Climates

Daylight performance is important factor in office building design. Kinetic facades are introduced in enhancement of indoor daylight. Parametric Daylight simulation was performed using Rhino software, algorithmic modelling developed by Grasshopper and Diva with Radiance interface to explore the applicability of parametric design to enhance daylight performance. Two types of kinetic movements, rotation and vertical transition are applied on horizontal louvers of an office building's south facade. The aim of this study is evaluating the effect of louvers configuration on achieving a balance point between sufficient illuminance level and light uniformity inside Selected space. Also, it aims at determining the optimum hourly pattern for louvers movement. The simulation was performed on a virtual prototype of office space in desert hot arid climate, Cairo, Egypt. The study focused on three hours "8:00, 12:00 and 16:00" of three critical days in the year "21st June, 21st December and 21st March". The proposed algorithm converts the illuminance values to a percentage format showing day-lit, under-lit and over-lit zones. Results show that using well studied kinetic louvers increase the percentage of day-lit zone to 63 percent instead of 53 percent without shadings and the percentage decrease to 35 percent if unstudied kinetic system is used.