

Effect of Day-lighting Strategies on Thermal Performance in Historical Buildings

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Abstract

The city of Cairo in Egypt, as it was inscribed on the world heritage list in 1997 under the title of "Islamic Cairo", recognizing its absolutely unquestionable historical, archaeological and urban importance, on the recommendation of the International Council for Monuments and Sites (ICOMOS). Historical Cairo proved over time to be one of the distinctive cities that contains a group of spatial relations, environmental and climatic solutions, which made its urban fabric and architectural compositions able to interact efficiently with climate and local environment. The aim of this paper is to evaluate the day lighting design strategies that made "Islamic Cairo" a distinctive sustainable environmental city, one day lighting strategy evaluated simultaneously in terms of indoor environmental quality, to reach the design criteria used by architects at that era. The performance of a historical building evaluated using computer simulation. This research process led to deriving a mathematical relation that link permitted day lighting with its accompanied thermal impact. The research findings led also to performative design guidelines, introducing a contemporary interpretation for using historical elements.

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