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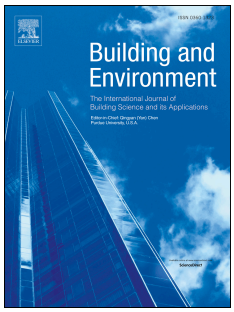

Qualitative analysis of promising materials and technologies for the design and evaluation of Climate Adaptive Opaque Facades

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Qualitative Analysis of promising Materials and Technologies for the design and evaluation of Climate Adaptive Opaque Facades

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Abstract

Over the last decades, new concepts of building envelopes have been proposed to achieve environmental targets. Adaptability of transparent components and facade integration of renewable energy harvesters are being widely studied. However, opaque facade components are less developed, even if their performance can be further optimized. When searching responsive technologies to propose new opaque facades, we learned they were usually created for other fields, which hampers their direct application in new envelopes. The successful implementation of these technologies in façade industry depends on the fulfilment of diverse requirements, such as durability, security or flexibility in design among others, but this information was not easy to get when they were not developed for the built environment. There is a lack of empirical studies evaluating these characteristics for adaptive technologies, which are mandatory to define the technical specifications of a facade. However, literature review provides a great amount of qualitative information and this study uses it for its analysis in order to gain insights into the degree of accomplishments of aforementioned requirements. Analysed technologies were kinetic elements, shifting thermal behaviour elements, dynamic components and systems. Overall, they still need to face several technical challenges for their suitable facade application. The novel visual analysis proposed in this paper is an useful tool for researchers undertaking this task, as it allows a fast and holistic comparison of the potentials