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A Techno-Economic Simulation Model to Reveal the Relevance of Construction Process Impact Factors for External Thermal Insulation Composite System (ETICS)

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Abstract : The reduction of energy consumption of the built environment has been one of the topics tackled by European Commission during the last decade. Increased energy efficiency requirements have increased the renovation rate of apartment buildings covered with External Thermal Insulation Composite System (ETICS). Due to fast and optimized application process, a large extent of quality assurance is depending on the specific activities of artisans and are often not controlled. The on-site degradation factors (DF) have the technical influence to the façade and cause future costs to the owner. Besides the thermal conductivity, the building envelope needs to ensure the mechanical resistance and stability, fire-, noise-, corrosion and weather protection, and long-term durability. As the shortcomings of the construction phase become problematic after some years, the common value of the renovation is reduced. Previous work on the subject has identified and rated the relevance of DF to the technical requirements and developed a method to reveal the economic value of repair works. The future costs can be traded off to increased the quality assurance during the construction process. The proposed framework is describing the joint simulation of the technical importance and economic value of the on-site DFs of ETICS. The model is providing new knowledge to improve the resource allocation during the construction process by enabling to identify and diminish the most relevant degradation factors and increase economic value to the owner.

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