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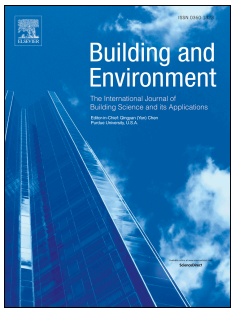

Experimental and numerical investigations of thermal performance of a Hemp Lime external building insulation

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Experimental and Numerical Investigations of Thermal Performance of a Hemp Lime External Building Insulation

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Abstract: Hemp-concrete is a green material which has become nowadays highly recommended in the construction field. It finds applications as internal or external thermal insulator in wooden frame walls. At wall scale, studies proved that using Hemp-concrete in building envelope can improve indoor hygrothermal comfort. However, at building scale, hemp-concrete is scarcely studied. In that context, a French building in Grand-Est region, Champagne-Ardennes, employing hemp-concrete as external insulator is selected and studied. An apartment is monitored for several months. Indoor temperatures, relative humidities, thermal heat flux as well as external weather conditions are measured using sensors installed inside the apartment and a weather station at the building roof. Measurements underline the hemp-concrete ability to dampen external weather conditions by showing good results for both indoor temperature and relative humidity. Experimental approach is then coupled with a numerical validation at the wall and room scales using SPARK simulation tool. Investigations are conducted on thermal heat flux through the wall, indoor office air temperature, and relative humidity. Results show a good agreement between numerical values and experimental measurements.

Keywords: Hemp-concrete, monitoring, experimental measurements, numerical validation, SPARK.