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Evaluation of Thermal Behaviour of Traditional Hımış Type Buildings in Kocaeli

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ABSTRACT

Adobe is comprised of earth, clay, water and straw that are mixed and sun-dried in molds. Adobe material has ability to moderate temperature swings in buildings. Materials such as adobe with high thermal mass have long time lag and moderating effects to temperature swings. It stores high percentage of the heat that it absorbs during the day, keeping interior temperatures of the dwelling lower than outside mean temperature in hottest period. It emits the stored heat to interior at night when outside temperature is lower than interior temperature. Adobe encountered in rural architecture considerably due to its high availability, is known as a good insulator providing air circulation by diffusion. In this study thermal performance of hımış type construction, composed of timber- adobe components is evaluated for a traditional dwelling located in Kocaeli, having temperate- humid climatic conditions by energy analysis program which includes dynamic heat transfer models to define thermal behavior of building materials with a certain amount of heat capacity. The effect of hımış construction with adobe infill wall system, with respect to variation of surface and outside and interior temperatures is calculated by Energyplus energy analysis program. The same procedure is performed for the same building by assuming the building is dizeme type construction among the wood panels of which timber material is used as infill material. The effect of building envelope of traditional hımış construction and a dizeme type construction on moderating interior climate during winter and summer conditions is compared. Maximum interior temperatures and its reduction below the outer maximum are examined considering the two examples in the context of decrement factor.

Keywords: Adobe, thermal performance, hımış, dizeme, energyplus.