

## The Apparent Thermal Conductivity of Pozzolana Concrete

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### Abstract :

The recent development of some lightweight construction materials, such as light concrete, can play an important role as an insulator, while maintaining sufficient levels of mechanical performance. The quality of insulation to provide depends on the climate, the exposure of the walls and also the materials used in the construction. The choice of a material to be used as an insulator, obviously, depends on its availability and its cost. This is a study of natural pozzolanas as basic components in building materials. It is intended to highlight their thermal advantage. It is economically advantageous to use pozzolana in substitution for a portion of the clinker as hydraulically active additions, as well as in compositions of lightweight concretes in the form of pozzolanic aggregate mixtures, which provide mechanical strengths that comply with current standards. A theoretical study is conducted on the apparent thermal conductivity of building materials, namely concrete containing pozzolana. Thermal modeling, apparent to that commonly used for porous materials, has been applied to pozzolana concrete. Experimental results on measurements of the apparent thermal conductivity of pozzolana concrete are reported in this study, using an approach that considers that concrete is composed of two solid ingredients, a binding matrix (hydrated cement paste) and all aggregates. A second comparative theoretical approach is used for the case where concrete consists of a solid phase and a fluid phase (air).

**Keywords** : Lightweight concrete - Pozzolana concrete – Porous materials – Thermal insulation – Modeling – Building.

**Journal Title / Revue** : Physics Procedia, ISSN : 1875-3892, DOI: 10.1016/j.phpro.2011.10.010 , Volume : 21, pp. 59–66, 2011.