

The effects of foam beads and kaolin on physical and thermal properties of concrete blocks

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Abstrak

It is widely use of air-conditioning systems in Thailand due to its location. It is located in a tropical zone with relatively high temperatures all year round, with high humidity and high intensity of sunlight. In order to save electrical energy for air-conditioning systems, preventing heat transfer into the building is required. The objective of this study is to investigate the physical and thermal properties of concrete blocks. An attempt is made to increase heat resistance of concrete blocks. Foam beads (0-0.30% by weight) and kaolin (0-70% by weight) were added in concrete block mixture to increase discontinuous voids in concrete. Compressive strength and water absorption of concrete blocks were tested. The testing results indicated that compressive strength decreased when foam beads and kaolin were added. Water absorption increased when foam beads were added. In contrast, the more kaolin added the less water absorption. The thermal conductivity coefficient of concrete blocks was also investigated. The results confirmed that the higher the amount of foam beads or kaolin added, the higher the thermal resistance of concrete blocks. Thermal time-lag behavior was also investigated. The results indicated that concrete block with kaolin took the longest time in heating and took the shortest time in cooling. These properties are good for heat prevention in hot climate regions. These concrete blocks which were developed and tested in this research conform to the Thai Industrial Standard. Finally, it can be concluded that because of its thermal behavior, concrete block with kaolin is a suitable energy-saving concrete block for hot and humid climates.