

A STUDY ABOUT PCM's INCORPORATION IN PASSIVE SOLAR SYSTEMS

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ABSTRACT

The energy consumption is a major contributor to the absorption of the economic resources of families and countries. One way to reduce the consumption is by increasing energy efficiency, which can be archived with the use of new building materials, such as Phase Change Materials (PCM's). The following work, consist in a study to evaluate the behaviour of thermo-active material (PCM), when used in an energy efficiency perspective. It is intended to demonstrate the advantages and disadvantages in the introduction of this material into the mortar of a "*trombe* wall" and into water tanks (water heaters), with the expectation of improving thermal comfort and reduce consumption in residential buildings. This work adopts the experimental approach, with the creation of physical models at reduced scale that simulated the thermal performance of building elements under study. In this experimental study, the best way to record the thermal behavior of these models based on the application of thermal loads was studied, either by artificial via either through atmospheric exposure. The phase change materials adopted in the study are the result of another research conducted in the Superior School of Technology and Management (ESTIG), the Polytechnic Institute of Bragança (IPB), which are the "Octadecano" and "Parafina". The behaviour differs in the melting point, so it can be applied in different situations. With this work we conclude that the incorporation of PCM's in mortars and applied to the building system *trombe* wall, can bring benefits in terms of thermal comfort, improved efficiency and sustainability in buildings. As for the water heaters reservoir, it is apparent that the application of PCM Parafina, the way it was applied in this work, didn't show advantages in energy level.