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Thermal Insulation System

ABSTRACT

The energy saving in building construction is very important and necessary as for the human comfort a big amount of energy is being consumed. Therefore for the construction of building, insulation material is to be chosen for energy saving. The thermal insulation keeps the indoor temperature constant and reduces the losses of energy during both summer and winter seasons.

In our study a mud house of size (5 m x 4m x 3.5 m) situated at Brij Vihar, district Ghaziabad has been selected. The house is analysed by the varied thickness of mud dung slurry insulation and varied straw at the roof by using MAT lab programming. From the calculated result, the most economic insulation thickness of mud wall has been suggested.

The overall energy saving of 55% has been suggested by using mud insulation as compared to other insulation material and the optimum insulation thickness of mud wall has been found as 0.067 m. The heating load also reduced 13% by using the optimum thickness of 13.21 cm straw roof.

Energy saving means to efforts made to decrease energy consumption. Energy saving can be done by using efficient energy sources, in addition with decreased energy consumption or reduced consumption from conventional energy sources. Some of the energy saving can be achieved by using suitable insulation thickness in building walls. In residential application, the most effective method of energy saving is to use proper insulation material. The energy consumption is distributed among four main sectors: building (domestic or commercial), transportation, industrial, and agricultural regions. The building sector is the significant

energy consumer among the other sectors. Day by day energy consumption rate has gradually increased due to Technological development, population growth, urbanization and industrial growth. Population growth means energy consumption has increased due to more building construction. It is necessary to save the energy due to inadequate energy resources, higher price of fuels and environmental pollution coming from burning of fuels. The energy conservation is achieved by the application of thermal insulation in buildings. Energy conservation supports the eco-friendly environment by providing energy saving in the terms of money.

The heat transfer from outer envelope of building can be reduce by using thermal insulation. Thermal insulation is the best method to make heat proof house. An insulated home is more comfortable as the temperature remains stable over changes of weather. It keeps the temperature of building cool in summers and warm in winters. It is very necessary to preserve the temperature of the house independent from atmospheric temperature for energy saving. From economic point of view, it may be better to select an insulating material with a lesser thermal conductivity rather than increase the thickness of the insulation in the mud wall construction. If the thermal conductivity of wall material is less, then less insulation will be required for a given extent of cooling and more operating volume will be available. The main purpose of Insulation is to decreases fuel consumption, unwanted emissions from the burning of fossil fuels and increases thermal comfort by reducing heat losses from building wall boundary. Initial investment due to addition of insulation will increased, but at the same time it reduces running cost of space heating or cooling. Insulation is a single investment process throughout the life time of a building to reduce energy consumption.