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KEY WORD: WALL/ NATURAL MATERIAL / ENERGY / THERMAL

CHOOPONG THONGKAMSAMUT: A DEVELOPMENT OF BUILDING THERMAL WALL FROM LOCAL NATURAL MATERIALS TO IMPROVE THERMAL COMFORT IN BUILDINGS, CASE STUDY: NON-AIR CONDITIONED STUDY ROOM NORTHEASTERN REGION, THAILAND. THESIS ADVISOR : ASSISTANCE PROFESSOR DR. VORASUN BURANAKARN, THESIS CO-ADVISOR: PROFESSOR DR.SOONTORN BOONYATIKARN, 124 PP. ISBN 974-17-0554-9.

This thesis is a part of integrated group research of "Northeastern Elementary School Design in Thailand" as a main theme. The objectives are improve thermal comfort through the use of local natural materials for the construction of a thermal wall. Materials that were studied include rice husks, hay, rough dirt, clay and sand. First, their basic properties in thermal performance were examine to see how well their thermal performance. Next, they were tested as composite wall with basic materials. Finally, they were study in a composite wall by applying with in simulation model.

From the study showed that a well wall system can protect heat easily and has an ability of time lag. The material has a heat protection property usualy has low density and high insulation. And the material that has a time lag property, mostly at high density. To study the wall as an low packed density insulation, the rice husk packed at 3 pounds/cubic foot along with sticky rice glue mixed with lime were used. When tested the rice husks wall in the test cell, the inside temperature is lower than the air temperature about 4.5 degree Celcius. For high packed density, soil cement blocks with a density of 88 pounds/cubic foot were used. And the temperature inside test cell is lower than the mean temperature approximately 3.5 degree Celcius with and ability of 4 hours time lag. By composed both wall into a new composite wall system using natural material from rice husks, packed on the outside and 2 inches air space in the middle. And the soil cement blocks were used inside the wall for time lag. The result showed that the test cell temperature is lower than mean air temperature approximately 6.5 degree Celcius and 6 hours for time lag.

This research is applied in simulation model wall, which then has a temperature of approximately 25 degrees Celcius, the room temperature is 26 degree Celcius, lower than mean air temperature apppoximately 6.5 degree Celcius with an ability of 8 hours time lag. This results have a good potential in heat protection and time lag, which can be developed to comfort zone.