THE RELATIONSHIP BETWEEN INDOOR AND OUTDOOR NIGHTTIME TEMPERATURE FOR CEILING INSULATED AND NON-INSULATED NATURALLY VENTILATED BUILDINGS

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ABSTRACT

Building with high indoor temperature lead to uncomfortable condition to its occupant, to reduce thermal transmission from transferring into the building, installation of insulation were done above the ceiling.

A field study had been done to observe the performance of ceiling insulation in the building at nighttime according to Malaysian climate. Two identical test cells made from the same type of materials with dimension 4m x 4m x 3m were used to run this study. Non-insulated test cell, Test Cell A (TCA) were keep as monitored unit while Test Cell B (TCB) were installed with mineral wool fiberglass with thickness 0.1m and thermal resistivity 2.86 m^2KW^{-1} above the ceiling.

Attic, indoor and outdoor temperatures for both test cells were logged using data logger for 10 days. Meanwhile, computer simulation also had done to compute the predicted temperature by the test cells. Result from the finding give that the indoor temperature for TCB is 0.3°C higher compared to TCA on field data and 0.2°C on simulation data. Regression between indoor versus outdoor temperature of field data and simulation data give the R^2 value of 0.8589 and 0.7202 from TCA and 0.8256 and 0.7287 from TCB. It is conclude that insulation rose up indoor temperature at night. The R^2 values give an overview that indoor temperature was highly dependent on outdoor temperature.

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