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SUPAWADEE BOONTHANOM : THE PROMOTION OF CONDUCTION HEAT LOSS THROUGH MAXIMUM STRATIFICATION. THESIS ADVISOR : ASSOC. PROF. SOONTORN BOONYATIKARN, Ph.D. THESIS CO-ADVISOR : ASSOC. PROF. SOMSIT NITAYA 145 pp. ISBN 974-332-537-9

At present, many building have been reduced heat inside by stack ventilation without checking enthalpy (enthalpy means the heat contain of unit mass of the air, which has two components, sensible heat and latent heat) of the hot and dry air removing out and of the cold and more moisture contain add in. This may increase thermal load of the building. The purpose of this study is to find the method to solve this problem. The heat removal using conduction heat loss in lieu of the heat convection through maximum stratification was used in this study by study parameter effecting this heat removal method

In the order to control the variables during the study the two identical test units were built as 1 m. diameter tube, 4 m. height, having 1 inch concrete wall, and next to it is the square wall using 0.2 mm. thickness zinc plate, white gloss coating which is heat conductor material with 0.90 m. height, and 6 mm. thickness clear glass roof. The experiment has been divided into 3 series. The first series was to compare inside temperature between the test unit, which reduce coefficient of heat transfer and the one, which did not. The second series was compare inside temperature between the test unit which increased the height of the square wall from 4.90 to 6.70 meters and the one which did not. The third series was to compare inside temperature between the test unit which change material of the upper square wall in the north and south facing from zinc plate to sheet of glass the one which did not. There 3 series experiment were not let the roof and upper square wall to expose to direct solar radiation. Moreover they are also adjusted the internal heat gain

The result of this study that the reduction of coefficient of heat transfer of tube wall would reduce external heat gain in during daytime, and reduce heat loss in the night time. That is to say the inside temperature are less depended on the outside air temperature. The increment of the height of the upper square wall would increase the heat loss, which will be obvious in the nighttime. But in the daytime which has the effect of solar radiation causing the temperature at human activities level (3 meters from the floor) of this two test unit are statistically in different when there is no or less internal heat gain and 1 – 2.5 °C different when there is much internal heat gain. The change of the upper square wall material in the north and south, inside temperature would not change this result. During the experiment the condensation occur at the surface of glass roof and upper square wall in the night time.

In conclusion, heat removal using conduction heat loss through maximum stratification will be more effective when ceiling height is 2 meters higher than typical height. The wall which devided into two parts, the lower part, with normal floor to ceiling height is built of material which reduce the external heat gain , the upper part, up from lower part, is built of material which has a high coefficient of heat transfer and low heat capacity in the order to not to delay heat removing. Moreover, this wall has not to be damage when facing with moisture and condensation. The temperature at the human activity level will be depended on the internal heat gain more than the environment, i.e. outside air temperature, sun, the heat exchange with the sky, wind, which cause less temperature swing during the daytime. The buoyancy of air will occur slowly therefore if the much internal heat gain, the hot air will buoy roughly, and obtain at the level of internal heat gain source. The temperature at the level higher than activity level is depended on the environment and ability to remove heat to the outside of the wall therefore cause more temperature swing than the lower level.

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