

ABSTRACT

Indonesia is a tropical country with daily average temperature range of 24-32°C and relative humidity as high as 60-90%. Air conditioning (AC) units are almost always needed to achieve the comfortable thermal condition. However, many buildings were (and still are) designed as unconditioned buildings. The installation of AC without addressing the envelope requirements will be a huge waste of energy consumption and the possibility of energy conservation regulations are not applicable. One of these regulations is on building envelope thermal load, which uses the OTTV (overall thermal transfer value) method and the calculation procedure is described in the Indonesian Standard (SNI) 03-6389-2010.

The research is carried out two cases study. In case study 1, the simulation and OTTV calculation are done in University building to find out OTTV value and energy consumption. Furthermore, if the building was designed as conditioned building then it would be seen the number of energy consumption and OTTV value. In case study 2 is done in typical building and University building. The purposes of case study 2 are to know the influence of envelope parameter to OTTV and EUI. Moreover, it also aims to see the relation between OTTV and EUI.

The result of this research shown OTTV of the conditioned building, without any treatment, is 54 W/m² and EUI 80.4 kWh/m²-year. If the building envelope is also retrofitted by installing a high performance glass, the OTTV can be brought down to 30 W/m² in compliance to the building regulation, and the energy consumption can be reduced to 12%. The OTTV and EUI has a linear relation. Furthermore, in university building the replacing of internal load doesn't influence the gradient each model. Whereas, in typical building has low number of skin factor and the replacing of internal load cause the difference of gradient about 25% and 30% difference of gradient in increasing three times internal load.

Keyword : OTTV, EUI, AC and thermal comfort