ABSTRACT

Architectural buildings in tropical regions are always equipped with various types of openings that aim to enter the wind from the outside into the room so that it serves as a natural ventilation. However, during the design stage of the building, there has been no attempt to formulate how to model the openings in an easy way. This research was conducted to find out how to model openings for natural ventilation. Modeling the openings required to calculate the air flow in a building. Ventilation is needed to keep the air in the room healthy and comfortable for humans. In this research, there has been modeling of openings for natural ventilation in three case studies using the AirflowNetwork model on the EnergyPlus software. In this model we need input data that is discharge coefficient and opening factor value. The object of this research is Belgian PASSYS cell building, box building and mosque building. Based on a second case study, casement type openings produce the highest airflow while hung, sliding and hopper type openings produce the lowest airflow. In the model of mosque building has been done with the modeling of openings with two different simulations, air flow within the mosque building decreased along with the reduction of defined openings. The thermal comfort of the box building model is in the range of -1.04 to 2.22 and the mosque building model is in the range of -1.26 to 3.26.

Keywords: openings, natural ventilation, thermal comfort.