

AIR FLOW DISTRIBUTION IN GRID PATTERN RESIDENTIAL ON THE SLOPE AREA

(Case Study : Kampung Jacky Chan in Aceh Besar)

By : Qurratul Aini
Student Identity Number : 3211204704
Supervisor : Dr. Eng. Ir. Dipl. Ing Sri Nastiti N.E., MT
Co. Supervisor : Ir. I Gusti Ngurah Antaryama, Ph.D

ABSTRACT

The worrying issue of global warming requires responsive design implementation to the environmental. One of design is through the use of natural ventilation as passive cooling, by maximizing airflow in the environment and considering climatic conditions, land forms and builtform, so it can have maximum adaptability to the environment. The profile of hills has effect on wind conditions, that we need the right combination of design in response to wind behavior, such as design application which considering topography in order to optimize in utilization of air flow as a refresher. On the flat area, the staggered pattern is more optimal than grid pattern in utilizing air flow. However, the grid pattern on the contour allows different flow of wind behaviour. Based on those theories, the assessment about effectiveness of the air flow in the grid pattern residential on the hilly areas was required.

The method use in this research is case study. Computational Fluids Dynamics (CFD) FLUENT simulation is used as an analysis tool. Data were collected from relevant agencies and from field measurement. Kampung Jacky Chan is the subject of research, as one of residential that have grid pattern of building on the hills of Aceh Besar. The research purpose is to evaluation influence of environmental pattern, such as the influence buildings configuration that formed due topography condition, in related to airflow distribution on contour area.

The results obtained is, that grid pattern on the hills can create better natural ventilation. Grid pattern that has certain toward wind direction can maximize air flow in a residential area. The grid pattern which formed by topography, can decrease wind shadow area and wind can reach into the building directly behind it. Air flow requirement in housing environment are commonly effective in create thermal comfort.

Keyword: *airflow, contour, grid pattern residential, warm humid climate, wind behaviour.*