

ABSTRACT

Air conditioning contributes for energy consumption of residential building in Indonesia. The Indonesia economic growth followed by increased use of air conditioning, but not followed by appropriate roof configuration. Building has a several parts as building envelope and the roof is the upper building envelope exposed to the sun's rays throughout the day. There is a lot of building roof configuration composed by various kinds of materials. Several study said that every materials give an effect to thermal loads of the room. However, it is not known which configuration is best in preventing an increase in room thermal load caused by solar radiation. A small thermal loads help to reduce the air conditioning energy consumption. In this study, testing has been carried out using enegyPlus with 7 roofing materials, 6 ceiling materials, 4 insulation materials, and 2 types of aluminum foil with 5 scenarios. The result is in case studies building: minimarkets at Telkom University, scenario 3 configuration with bitumen roofing material, polyester insulation with bubble aluminum foil below roofing material, and acoustic ceiling has the best performance.

Keywords: *building envelope, thermal loads, roof configuration.*