DAYLIGHTING OPTIMIZATION FOR ENERGY EFFICIENCY ON LOW COST FLAT WITH TOWER CONFIGURATION IN DENPASAR
Case Study : Low Cost Flat of Dinas Kepolisian Daerah Bali

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ABSTRACT

Daylighting strategy in a house is a method for energy efficiency where daylighting can substitute electrical lighting in daytime. Low-cost flat with tower configuration has potency to gain optimum daylight from its facade but it has problem with building depth. Atrium and double-sided openings are few strategy that can be applied in daylight design to gain the amount of daylighting which is needed and still visually comfort.

This research is experimental research using computer simulation technique with Desktop Radiance 1.02 and Autocad2000 computer programme. Computer simulation technique is being used to simplified optimization process according to the research goal dan be able to show real condition as close as possible. To find out the effect of illumination to visual comfort, glare potency by the existence of high comparison (exceeding 1:40) between lowest and highest illumination level in a space function as control.

Research operational started with field measurement then continued with preliminary simulation according to real condition of the research object. Comparison between field measurement and preliminary simulation to find out the daylighting characteristic. From this daylight characteristics is concluded that quantity of illumination at livingroom not adequate for activity and over-illuminated happens at Main bedroom and Bedroom. Both of this daylight condition need to be optimated to reach daylight quantity that adequate to activity and visually comfort.

Optimation process conducted in two phase which are daylighting optimization for living room and glare potency reduction optimization in main bedroom. Daylighting optimization conducted by altering roof material for core area and its result is increased illumination level at living room. Glare potency reduction optimization conducted by changing listplank width from 1 m at the beginning become 1,2 and 1,5m. Optimation with 1,5 m listplank width able to improving visual comfort by lowering the illumination contrast value and increase the percentage of Daylight Factor level at visual comfort range for activity at bedroom.

Keywords : Daylighting, Low Cost Flat with tower configuration, Energy Efficiency