

An Investigation on the Effect of Window Tinting on Thermal Comfort inside Office Buildings

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Abstract : Thermal comfort studies are very important during the early stages of the building's design. If this study was ignored, problems will start to occur for the occupants in the future. In hot climates, where solar radiations are entering buildings all year long, occupant's thermal comfort in office buildings needs to be examined. This study aims to investigate the thermal comfort at an existing office building at the Australian College of Kuwait and test its validity and improve occupant's thermal satisfaction by covering windows with a heat rejection tint material that enables sunlight to pass through the office while reflecting solar heat outside. Environmental variables were measured using thermal comfort data logger INNOVA 1221 to find the predicted mean vote (PMV) in the selected location. Also, subjective variables were measured to find the actual mean vote (AMV) through surveys distributed among occupants in the selected case study office. All the variables collected were analyzed and classified according to international standards ISO 7730 and ASHRAE55. The results of this study showed improvement in both PMV and AMV. The mean value of PMV based on the original design was 0.691 which dropped to 0.32 after installation and it still at comfort zone. Also, the mean value of the AMV has improved for the first occupant, where before it was -0.46 and it became -1 which is cooler. For the other occupant, it was slightly warm with a mean value of 0.9 and it was improved and became cooler with a -0.25 mean value based on American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) seven-point scale.

Keywords : thermal comfort, office buildings, indoor environments, predicted mean vote

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