Thermal comfort differences between polycarbonate and opaque roofing material installed in bus stations of Malaysia

Abstract

Bus shelter as a semi-outdoor space protectsindividuals from direct sun light, rain and wind. The roofing material of busstop has extreme influence on environmental and subjective conditions ofpersons within this space. In this study, the principal concentration isdistinguishing the differences between installation of Polycarbonate plasticroofing material and that of opaque protection cover as two widespread roofingmaterials in obtaining human thermal comfort in equatorial climate of Malaysia. Hence, two bus stops, one covered by Polycarbonate translucent plastic and onewith opaque concrete-based tile, were selected to evaluate their inner thermalcomfort condition by measurement of four main microclimatic parameters (i.e.air temperature, wind velocity, humidity and mean radiant temperature) as wellas subjective survey in a university campus using the Physiological EquivalentTemperature (PET) as thermal index. The study found that the Polycarbonateroofing material is not appropriate material for permanence in bus shelters ofMalaysia neither objectively nor subjectively comparing with opaque protectivecover. Additionally, it was revealed adoption greatly impacts individualthermal perception which should not be neglected in the examination of thermalcomfort in non-indoor spaces.

Keyword: Human thermal comfort; Roofing materials; Adaption; PET.