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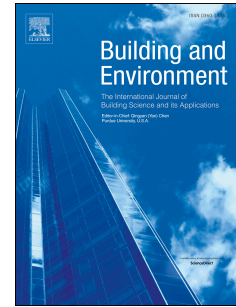
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Thermal comfort in desert refugee camps

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Abstract

Long-term encampment is a growing aspect of a growing refugee crisis. There is hence the need to ensure shelters provide a safe and suitable environment. We present the first field study including social and thermal comfort surveys and physical measurements conducted in Syrian refugee camps in Jordan, during summer and winter. This required the creation of a new Arabic thermal comfort survey based on the numerical ASHRAE scales to ensure the elimination of any ambiguities due to translating the scales. The three analysis methods used (linear, logistic and multiple logistic regression) all gave the same neutral temperature, 23°C; however, Fanger's predicted mean vote model was found to underestimate the adaptive potential of the refugees. The comfort band found using logistic regression ranged from 28.4°C to 17.2°C, suggesting a significant adaptability of the refugees, but not one equal to the temperature range found on site. Issues with the clash between ventilation, privacy, security and sand ingress were identified, and this points to a need to re-evaluate shelter ventilation in general. However, given the extreme conditions recorded, natural cross ventilation alone will not be sufficient in achieving summer comfort. Combining this with the observation that, due to safety and lack of resource, the refugees have no means of heating at night, a shelter solution that successfully includes insulation, and possibly thermal mass would seem important.

Keywords

Thermal comfort, Refugee camps, Arabic survey, Field study, Jordan

Abbreviations

TSV thermal sensation vote

TPV thermal preference vote

PMV predicted mean vote

Nomenclature

T_n Neutral temperature

T_o Operative temperature

I_{cl} Clothing insulation

V_a Air velocity

T_a Air temperature

T_g Globe temperature

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