Analisis Kenyamanan Termal pada Bangunan Hunian di Padukuhan Derpoyudan

Ariiq Dzaki Muslim

19/446509/TK/49614

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INTISARI

Tantangan kenyamanan termal di hunian Padukuhan Derpoyudan, dengan suhu mencapai 31,8 °C dan kelembapan 79%, menuntut analisis yang dapat menghubungkan keluhan subjektif penghuni dengan data lingkungan yang objektif.

Penelitian ini menggunakan metode campuran yang dimulai dengan survei persepsi subjektif pada 46 rumah untuk memetakan sensasi termal umum. Tahap selanjutnya adalah studi kasus kuantitatif pada satu rumah, di mana parameter fisik seperti suhu, *mean radiant temperature* (MRT), dan kelembapan diukur dengan sensor. Data ini, digabungkan dengan profil spesifik responden yakni insulasi pakaian 0,18 clo dan laju metabolisme 1,0 MET, yang kemudian digunakan untuk menghitung indeks *predicted mean vote* (PMV) dan *predicted percentage of dissatisfied* (PPD) sesuai standar ASHRAE 55.

Hasil survei umum yang menunjukkan mayoritas (57%) penghuni merasa "panas" divalidasi secara kuantitatif oleh studi kasus. Pada jam puncaknya yakni pukul 12 WIB, studi kasus menunjukkan PMV +2,4 ("Panas") dengan PPD 91,1%. Validasi tercapai melalui keselarasan antara hasil perhitungan objektif dengan persepsi subjektif responden di waktu yang sama dengan penlilaian "Panas". Hal ini menunjukkan kecenderungan ketidakpuasan termal warga Padukuhan Derpoyudan dan membuktikan bahwa keluhan termal yang dirasakan warga secara luas memiliki dasar kondisi fisik lingkungan yang nyata.

Kata kunci: kenyamanan termal, preferensi termal, studi lapangan, PMV, PPD

Pembimbing Utama : Dr. Eng. Ir. Mohammad Kholid Ridwan, S.T., M.Sc., IPU., ASEAN Eng.

Thermal Comfort Analysis of Residential Buildings in Derpoyudan Hamlet

Ariiq Dzaki Muslim

19/446509/TK/49614

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ABSTRACT

The challenge of thermal comfort in the rural residences of Derpoyudan Hamlet, with temperatures reaching 31.8 °C and humidity at 79%, demands an analysis that can connect the occupants' subjective complaints with objective environmental data.

This research uses a mixed-method approach, beginning with a subjective perception survey in 46 houses to map the general thermal sensation. The next stage is a quantitative case study in one house, where physical parameters such as temperature, mean radiant temperature (MRT), and humidity were measured with sensors. This data, combined with the specific profile of the respondent, namely, clothing insulation of 0.18 clo and a metabolic rate of 1.0 MET, was then used to calculate the predicted mean vote (PMV) and predicted percentage of dissatisfied (PPD) indices according to the ASHRAE 55 standard.

The general survey results, which showed a majority (57%) of occupants feeling "hot," were validated quantitatively by the case study. At its peak time at 12 p.m., the case study showed a PMV of +2.4 ("Hot") with a PPD of 91.1%. Validation was achieved through the alignment between the objective calculation results and the respondent's subjective perception at the same time, which was rated as "Hot". This indicates a tendency of thermal dissatisfaction among the residents of Derpoyudan Hamlet and proves that the widely felt thermal complaints have a basis in real physical environmental conditions.

***Keywords**: Thermal comfort, thermal preference, field study, PMV, PPD*

Supervisor : Dr. Eng. Ir. Mohammad Kholid Ridwan, S.T., M.Sc., IPU., ASEAN Eng.