

ABSTRAK

Ruang kelas SMA Negeri 1 Matang Kuli masih mengandalkan ventilasi alami sehingga rawan mengalami ketidaknyamanan termal pada iklim tropis lembap. Penelitian ini menganalisis kenyamanan termal tiga ruang kelas menggunakan model kenyamanan termal adaptif berdasarkan ASHRAE Standard 55, Metode penelitian yang digunakan adalah kuantitatif deskriptif. Data diperoleh melalui observasi, pengukuran langsung temperatur udara, kelembapan relatif, kecepatan udara, suhu permukaan, nilai insulasi pakaian, tingkat aktivitas, serta kuesioner siswa, kemudian dianalisis menggunakan CBE Thermal Comfort Tool dan skala Likert. Hasil pengukuran menunjukkan suhu ruang kelas berkisar 29,7°C sampai 31,8°C dengan kelembapan relatif 78,7% sampai 82,7% dan kecepatan udara 0 m/s. Suhu operatif seluruh ruang kelas berada di luar batas kenyamanan adaptif pada tingkat penerimaan 80% maupun 90%, sehingga dikategorikan terlalu hangat pada pagi maupun siang hari. Sebagai pembanding, nilai PMV berkisar 1,73 sampai 2,58 dengan PPD 63% sampai 95%, sedangkan hasil kuesioner menunjukkan 36,01% sampai 52% siswa merasa tidak nyaman secara termal. Disimpulkan bahwa ruang belajar belum memenuhi kenyamanan termal adaptif, sehingga diperlukan strategi pasif berupa penambahan vegetasi, material penutup atap, dan warna bangunan, serta strategi aktif berupa kipas angin dan Direct Evaporative Cooling.

Kata kunci: kenyamanan termal, metode adaptif, ASHRAE 55, ventilasi alami, ruang kelas

ABSTRACT

Classrooms at SMA Negeri 1 Matang Kuli still rely on natural ventilation, making them prone to thermal discomfort in a humid tropical climate. This study analyzes the thermal comfort of three classrooms using the Adaptive Thermal Comfort model based on ASHRAE Standard 55. Data were collected through observation and direct measurement of air temperature, relative humidity, air velocity, surface temperature, clothing insulation, and activity level, together with a student questionnaire, then analyzed using the CBE Thermal Comfort Tool and a Likert scale. Classroom temperatures ranged from 29.7 to 31.8 degrees Celsius, with relative humidity of 78.7 to 82.7 percent and air velocity of 0 m/s. Operative temperatures in all classrooms exceeded the adaptive comfort limits at both acceptability levels, so all were categorized as too warm in the morning and at midday. PMV ranged from 1.73 to 2.58 with PPD of 63 to 95 percent, while the questionnaire showed 36.01 to 52 percent of students felt uncomfortable. The classrooms have not met Adaptive Thermal Comfort criteria, requiring passive strategies such as vegetation, roof material, and building color, and active strategies such as fans and Direct Evaporative Cooling.

Keywords: *thermal comfort, adaptive method, ASHRAE 55, natural ventilation, classroom*