Analisis Cooling Load di Fasilitas Kesehatan Tingkat I Berdasarkan Standar Green Building, ASHRAE 241 Dan 170 Dengan Implementasi Sistem VRF Dan Chiller Untuk Efisiensi Energi = Analysis of Cooling Load in Level I Health Facilities Based on Green Building Standards, ASHRAE 241 and 170 with the Implementation of VRF and Chiller Systems for Energy Efficiency

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Abstrak

Infeksi nosokomial atau Hospital Acquired Pneumonia (HAP) merupakan tantangan signifikan dalam pelayanan kesehatan, yang berdampak besar pada morbiditas, mortalitas, dan biaya perawatan. Kualitas udara dalam ruangan, terutama di fasilitas kesehatan, berperan penting dalam pencegahan HAP. Sistem pemanas, ventilasi, dan pendingin udara (HVAC) adalah komponen utama yang berfungsi mengendalikan kualitas udara untuk meminimalkan risiko penyebaran mikroorganisme patogen. Penelitian ini menganalisis cooling load di puskesmas Jakarta Timur menggunakan perangkat lunak Energy Plus dengan tiga skenario: kondisi aktual, standar Greenship, dan standar ASHRAE 241 dan 170. Tujuan penelitian ini adalah mengevaluasi sejauh mana desain sistem pendingin dapat memenuhi kebutuhan kualitas udara dalam ruangan serta mencegah risiko HAP. Standar Greenship difokuskan pada efisiensi energi dan keberlanjutan lingkungan, sedangkan standar ASHRAE memberikan panduan spesifik untuk ventilasi dan desain sistem HVAC di fasilitas kesehatan. Hasil penelitian ini diharapkan memberikan rekomendasi praktis untuk desain sistem pendingin yang optimal dalam meningkatkan kualitas udara dan mencegah risiko HAP. Selain itu, penelitian ini berpotensi menjadi referensi penting bagi pengembangan kebijakan nasional terkait desain sistem pendingin di fasilitas kesehatan di Indonesia, khususnya puskesmas.

.....Nosocomial infection or Hospital Acquired Pneumonia (HAP) is a significant challenge in health services, which has a major impact on morbidity, mortality, and treatment costs. Indoor air quality, especially in healthcare facilities, plays an important role in HAP prevention. Heating, ventilation, and air conditioning (HVAC) systems are the main components that function to control air quality to minimize the risk of spreading pathogenic microorganisms. This study analyzed the cooling load in the East Jakarta health center using Energy Plus software with three scenarios: actual conditions, Greenship standards, and ASHRAE 241 and 170 standards. The purpose of this study is to evaluate the extent to which the design of the cooling system can meet the needs of indoor air quality and prevent the risk of HAP. The Greenship standard is focused on energy efficiency and environmental sustainability, while the ASHRAE standard provides specific guidance for ventilation and HVAC system design in healthcare facilities. The results of this study are expected to provide practical recommendations for optimal cooling system design in improving air quality and preventing HAP risks. In addition, this research has the potential to be an important reference for the development of national policies related to the design of cooling systems in health facilities in Indonesia, especially health centers.