



植栽對建築物屋頂表面熱通量影響

鄭思彤*、陳起鳳**

摘要

本研究選定以數學模型來計算綠屋頂對建築物能源的影響。眾所周知，植栽能有效降溫，而綠屋頂對建築物能源占有一定的影響。目前國外有相關綠屋頂對建築物能源經濟效益方面的研究，而我國對於綠屋頂對建築物能源影響的研究主要多集中在實測上，關於綠屋頂對建築物能源的影響等效益則鮮少有相關探討，尤其少有利用數學公式計算結果。因此本研究將利用 Sailor(2008)根據 Frankenstein and Koenig(2004)研究之熱平衡公式所改良的綠屋頂之能量平衡模型，以計算綠屋頂的熱通量來探討對建築物能源的影響。由於建築物能源的使用量可透過日照溫度直接受影響，而太陽輻射的吸收率是以熱通量來表示，故此隨著綠屋頂的溫度變化，再加入已知的係數，分別計算出綠屋頂中葉子和泥土熱通量的變化，以找出綠屋頂對建築物能源的影響。已知綠屋頂會為環境帶來許多好處，希望透過本研究成果能供未來建築設計者規劃參考，對日後規劃環境更有所幫助。

關鍵字詞：綠屋頂、熱通量、建築物、建築物能源

*中國文化大學土地資源系 學生

**中國文化大學土地資源系 教授

Vegetation on building exterior surfaces and economic benefits rarely related to different roof surfaces. Sedum Linum roof surface and the amount of water situation, about 5.4°C at night, and the flux of order. The results and the heat cooling effect of buildings.

Keywords



Effects of Vegetation on Heat Flux of Roof Surface

Sze-Tung Cheng , Chi-Feng Chen

Abstract

Vegetation can effectively reduce ambient temperature and have positive impact on building energy usage. Many studies have discussed effects of green roof on building energy and economic benefits, but studies in Taiwan are focus on surface thermal performance and rarely relate to building energy savings. This study measured consecutive temperature of different rooftop surfaces in 12 hours, including ordinary rooftop, soil, Manila Grass and Sedum Lineare. The measured data was then used to calculate the heat flux between different roof surfaces. The results showed that the temperature difference between ordinary rooftop and the ambient environment was the highest at noon, which is 11.8°C. However, at the same situation, temperature of Sedum Lineare surface was lower than the ambient temperature about 5.4°C. Moreover, the ordinary rooftop was higher 2.8°C than the ambient temperature at night, and Sedum Lineare was lower 4°C than the ambient temperature. The average heat flux of ordinary rooftop surface was 114.2W/m² and Sedum Lineare surface was -57.7 W/m². The results showed that vegetation can moderate the temperature fluctuation of roof surface, and the heat flux direction of green roofs is opposite to ordinary rooftop, which helps to cooling external temperature of buildings and might benefit to reduce energy use inside the buildings.

Keywords : Vegetation 、 Green Roofs 、 Heat Flux 、 Building Energy