Outdoor space quality: Impact of deep canyon thermal comfort in an urban residential community

Amr Sayed Hassan Abdallah Saleh N.J. Al-Saadi

Abstract:

Urban design between buildings has a strong impact on people who use outdoor spaces. It is directly linked to the configuration of the street axes, orientation, and canopy ratio. This study investigates the impact of urban geometry between residential buildings in Assiut city, Egypt with a ratio of (H/W) 4 as a common design concept of big complexes, on residences thermal comfort and flats indoor environment. Thermal comfort for outdoor spaces in the urban canyon was evaluated based on field measurement in a different location using different parameters (Temperature, relative humidity, CO2, and wind speed) during the hot months of the summer season. Also evaluation for indoor environment of different flats overlooking the urban canyon. The results indicated that the quality of outdoor spaces, in deep canyons of the El-Ebrahimia complex, affects residents thermal comfort with a significant reduction of canyon temperature is achieved with a temperature difference range from 7 to 10 Kelvin (K) between outdoor temperature and canyon temperature and 10 K for flats overlooking the canyon due to canyon design and (H/W) ratio. Temperature reduction of canyon temperature causes thermal comfort for residents to practice social activities with a temperature range between 26 °C to 30 °C for the Standard Effective Temperature (SET*). The study provided information to use deep urban canyons as multiple designs in residential complexes of the Assiut hot arid climate.

Keywords:

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