The Effect of Rooftop Garden on the Internal Temperature of the Rooms in Buildings

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Abstract

A period of rapid industrialization and urban expansion has pushed cities to build skyscrapers, streets, and homes often at the expense of plant life. Only until recently have people realized that uprooting plant life has led to a number of negative consequences, one of which is the Urban Heat Island Effect. To mitigate its effects, urban planners, especially in the United States, and some European countries, have been using rooftop gardens as a way to reintegrate vegetation in urban areas. The purpose of this research is to study the effectiveness of rooftop gardens in reducing the Urban Heat Island Effect in the climate and conditions in Jeddah, Saudi Arabia. This research uses a designed experiment to measure the extent of the effects. Model buildings with and without a rooftop garden were used in the experiment. The internal temperature of each building was recorded at regular intervals for a period of time, and the results were then compared. The results indicated that there is a difference in temperatures between the two buildings especially in the peak temperatures. It is expected that if rooftop gardens were implemented on a large scale, they could reduce energy consumption, and therefore energy bills.

Keywords
Environmental engineering, Urban Heat Island, Rooftop gardens

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Biography

Abrar S. Al-Amoudi is a third year industrial engineering student at King AbdulAziz University, Jeddah, KSA. She is in process to obtain a patent in "Left-Right handed Chair". Abrar stays involved in extracurricular activities; She is a member in a focus group of her faculty and an active member in IEEE. She is helping out with many faculty's events; working in summer as the main responsible organizer and speaker for freshman engineering students annual program. She has strong interpersonal skills enhanced by taking part as a Vise President in Toastmasters International club to develop confidence and communication abilities as she is one of founder partners of the this club in King Abdul Aziz University. She represented her faculty in many conferences inside and outside the country as she has the skills of speaking, writing and reading fluently in three languages (Arabic, English and Malayan).

Lamees M. Alhashimi is a student at King Abdulaziz University. She is currently in the process of obtaining a bachelor's degree in Industrial Engineering. Throughout her academic career, she has strived to get involved in different academic and non-academic activities. She has served as the club treasurer for the Toastmasters international club. She also participated in the Saudi SmartGrid conference held at the Jeddah Hilton, and the Sixth Scientific forum for research in the fields of engineering and technology. In her leisure time, she plays basketball for a local team in Jeddah.

Lujain A. Aljawi is a third year industrial engineering student at King AbdulAziz University, Jeddah, KSA. Lujain is a very ambitious student who looks forward in many extracurricular activities either in her college or outside. She is the leader of her 2013 batch in college, a member of the focus group and recently became the star of engineering college. Lujain is interested in scientific research, she is an associate member of a small organization called (Manara Research) and was one of the 18 saudi students who participated in the international research competition (Intel Isef) . She has also been helping in organizing events such as TEDx , The jump and Ibdaa . Lujain has represented her college in many conferences locally and internationally .She is a social student and expresses leader skills and been in public relation positions.

Raneem W. Gashgari is currently an Industrial Engineering student at King Abdulaziz University in Jeddah, Saudi Arabia. She has done a lot of volunteer works, mostly as an organizer. Raneem involves in many collage activates including, organizing and speaking in an event for freshman students, a member of the sport committee in Engineering college and helped to coordinate the Faculty of Engineering in summer of 2014. Ms. Raneem holds two Superior Certificate from the deanship of student affairs at King Abdulaziz University. Also, she attended "What's Next? Navigating Global Challenges with the Innovation Generation" summit as a student delegate representing King Abdulaziz University which was held in Abu Dhabi, United Arab Emirates. She is in charge of IEEE branch in Engineering College, Female section and a member of IIE.