

## Accepted Manuscript

Title: Green Roof Thermal Buffering: Insights derived from fixed and portable monitoring equipment

Authors: J. Alvizuri, J. Cataldo, L.A. Smalls-Mantey, F.A. Montalto



PII: S0378-7788(16)31802-3  
DOI: <http://dx.doi.org/doi:10.1016/j.enbuild.2017.06.020>  
Reference: ENB 7683

To appear in: *ENB*

Received date: 6-12-2016  
Revised date: 3-4-2017  
Accepted date: 10-6-2017

Please cite this article as: J.Alvizuri, J.Cataldo, L.A.Smalls-Mantey, F.A.Montalto, Green Roof Thermal Buffering: Insights derived from fixed and portable monitoring equipment, Energy and Buildings <http://dx.doi.org/10.1016/j.enbuild.2017.06.020>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Green Roof Thermal Buffering: Insights derived from fixed and portable monitoring equipment

Authors: J. Alvizuri, J. Cataldo, L. A. Smalls-Mantey, F. A. Montalto<sup>1</sup>

*Cooper Union, Cooper Union, Drexel University, Drexel University*

<sup>1</sup> Corresponding author.

***E-mail address:*** [fmontalto@coe.drexel.edu](mailto:fmontalto@coe.drexel.edu) (F. A. Montalto).

### **Abstract:**

Thermal buffering of the 27,316 m<sup>2</sup> Jacob K. Javits Convention Center Green Roof (JJCC Green Roof) was investigated in the field, as well as in the laboratory in order to determine its ability to insulate a building. An instrumented replica of the green roof cross section was developed to elucidate the inner-workings of the system. During the course of a year a total of twelve field monitoring campaigns were conducted to measure temperatures with 249 images collected at sixteen different locations (eight exterior and eight interior). During this first sequence of measurements, the north green roof had already been completed, while the south green roof was gradually being installed. Additional field imaging was performed on two separate days in August (on 08/08/15, 08/22/15), and on one day in January (on 01/22/16) between sunrise and sunset (generating an additional 850 images). To isolate the thermal performance of individual components of the roof structure, a physical model of the roof was constructed in a laboratory, instrumented with thermistors, and subjected to a heat lamp. A one-dimensional heat conduction model was used to investigate physical relationships revealed by the field and laboratory observations, and represents the experimental data well. The results indicate that the construction of the green roof significantly reduces heat flux through the convention center roof. The mean internal and external temperatures on the north and south sections of the roof on the first monitoring day (when the north green roof was complete, but the south green roof had not yet been installed) and the last monitoring day (when both north and south green roof sections were complete) are provided to support the insulating value of the green roof layers. The mean exterior temperature on the south roof on the first day of

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات