

Accepted Manuscript

Title: A novel vertical greenery module system for building envelopes: The results and outcomes of a multidisciplinary research project

Author: V. Serra L. Bianco E. Candelari R. Giordano E. Montacchini S. Tedesco F. Larcher A. Schiavi



PII: S0378-7788(17)31383-X
DOI: <http://dx.doi.org/doi:10.1016/j.enbuild.2017.04.046>
Reference: ENB 7542

To appear in: *ENB*

Received date: 15-11-2016
Revised date: 14-3-2017
Accepted date: 17-4-2017

Please cite this article as: V. Serra, L. Bianco, E. Candelari, R. Giordano, E. Montacchini, S. Tedesco, F. Larcher, A. Schiavi, A novel vertical greenery module system for building envelopes: the results and outcomes of a multidisciplinary research project, *Energy and Buildings* (2017), <http://dx.doi.org/10.1016/j.enbuild.2017.04.046>

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.

A novel vertical greenery module system for building envelopes: the results and outcomes of a multidisciplinary research project

Keywords Vertical greenery modular system, Green wall, Green façade, Living wall system, Energy performance, Environmental performance, LCA, Acoustic performance, LAI, Vegetation species, Building envelope.

A novel vertical greenery module system for building envelopes: the results and outcomes of a multidisciplinary research project

Keywords Vertical greenery modular system, Green wall, Green façade, Living wall system, Energy performance, Environmental performance, LCA, Acoustic performance, LAI, Vegetation species, Building envelope.

Highlights

- - A novel VGMS made up of recycled/natural and highly performing materials from the energy/environmental point of view, has been designed, prototyped and in lab/in field monitored through a multidisciplinary approach
- - The technological issues, biometric parameters, and the acoustic, thermal and mechanical aspects were complementarily investigated.
- - Thermal performance analyses showed interesting effect both during heating and cooling seasons
- - An acoustic analysis demonstrated that the system acts well as a sound insulation system, and its high sound absorption could be exploited to reduce the urban canyoning effect

0-

abstract (max 200 words)

Vegetation in architecture can be considered a proper design strategy that is aimed at improving not only the performances of buildings, but also the outdoor climate. Different technological solutions have been proposed over the years to cover buildings with vegetation, i.e. green roofs, green walls and green balconies. A particular typology of green wall, which has recently been gaining high consensus among designers, is the vertical greenery modular system (VGMS). The positive impact of this type of technology on the performance of buildings is related to several factors, such as the façade orientation, the use of the building, climatic conditions, the type of plants, the substrates and wall assemblies, as well as mechanical and technological issues. A multidisciplinary approach is therefore needed, and different skills have to be joined together right from the early design phase in order to optimize and balance all the aspects that are involved. In this framework, a research project has been carried out in Turin (North West Italy), with the aim of developing a novel VGMS, constituted by a modular box covered with vegetation, made up of recycled/natural and highly performing materials from the energy/environmental point of view. After the design phase, the actual performance of the VGMS was assessed, through laboratory and long-term in field monitoring, and at the same time, the technological issues, biometric parameters, and the acoustic, thermal and mechanical aspects were investigated.

1- Introduction

Urban greening provides ecosystem services, and the role of green areas for the well-being of citizens is acknowledged throughout the world [1]. The positive effects of urban vegetation are also important at the built environment microclimatic performance level, due to climate change and pedestrian thermal comfort reasons [2]. The urban environment is characterized by particular conditions, in terms of light, water and nutrient supply, as well as particular temperature and pollution regimes. These aspects can represent a drawback for the development of plants and trees, especially if the purpose is to create urban greening with high aesthetic performances. Nevertheless, green roofs and green walls are the best examples of the extreme relationship between nature and technology in urban greening [3].

متن کامل مقاله

دریافت فوری ←

ISIArticles
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 کلید کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات