

Dear Reader,

The international Green Roof community maintains vibrant activity. Within the next months some major events will bring together experts from all over the world to exchange ideas and share experiences in the field of Green Roofs. In particular Great Britain has made a significant step towards Green Roof policies thanks to the activities of the national Green Roof organization Livingroofs and Sheffield University.

At the same time the number of prime examples for 'Green Building Constructions' is also increasing all over the world. Two of these projects are described in the current issue of Green Roofs News – the 'Meydan' shopping centre in Istanbul/Turkey and the FiftyTwoDegrees office building in Nijmegen/Netherlands. Both projects show, in a very impressive way, that creativity in the application of Green Roofs knows no bounds.

Have fun reading!

Wolfgang Ansel
Director IGRA

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Preview

Showcase for a new generation of shopping centres: The Meydan Project in Istanbul

The Turkish word 'Meydan' describes a meeting place where people come to discuss, compete and achieve. The latest Metro Group Asset Management shopping centre 'Meydan' in Istanbul also wants to become a buyer's paradise. In order to integrate both aspects, the project combines outstanding architecture with a landscape and park concept that includes more than 30,000 m² of Green Roofs.

Istanbul, the 12 million inhabitant megalopolis which connects the European and Asian continents, has received a new attraction. Although the city is not short of markets and bazaars (e.g. the wonderful 'Grand Bazaar'), the new shopping square in the heart of the Ümraniye district is absolutely extraordinary. The 70,000 m² mall hosts more than 50 shops (e.g. real, GAP, Adidas, Nike, Mango), a number of restaurants and a movie theatre. On first sight nothing to write home about but what makes the 'Meydan' project a showcase for a new generation of shopping centres is the synergetic combination of ecology and economy which was developed by the London architect group Foreign Office Architects (FOA).

In an initial step the FOA architects carefully examined the building plot and the destined catchment area of



Taking a break – Up on the roof

the shopping centre. This approach also included the access paths for the visitors, the creation of a wide-ranging public meeting place (the 'Piazza') in the heart of the commercial property and a natural landscape directly on site.

By following the concept of efficient multiple land-use, the creation of the park, which provides a kind of green oasis in the concrete jungle of the surrounding residential and industrial districts, also integrates the roof areas of the shopping centre. 30,000 m² of meadow vegetation on the roofs makes for smooth natural transitions between the building complexes and some parts of the Green Roof are accessible and equipped with seating. The special atmosphere of this park and the fantastic perspective invite the visitors to take a break from the shopping frenzy and enjoy the relaxing atmosphere.



A technical challenge for Green Roof engineers – the steep Green Roof areas

The basic design of the roofs resembles a hilly landscape. Therefore three different Green Roof systems were used in coordination with the different slopes of the roof areas. The flat areas (17,000 m²) feature a regular three layer build-up with a protection mat, drainage layer, filter sheet and substrate layer. For the sloped roof parts (10° - 25°, approx. 12,000 m²) a drainage element made of EPS (expanded polystyrene)

(height 7.5 cm) was introduced which ensures the interlocking of the substrate and prevents erosion. Additionally, the very steep areas were equipped with 'Georaster' elements which guarantee a stable and flat interconnection and provide enough space for the plant roots to establish and develop. The Green Roof system of the German company ZinCo GmbH was installed on a premium root-resistant waterproofing (material: polyisobutylene, manufacturer: FDT – FlachdachTechnologie GmbH & Co. KG, Mannheim), which guarantees root/rhizome resistance according to the FLL method.

The vegetation features common species of the European dry meadow vegetation e.g. *Festuca ovina*, *Festuca cinerea*, *Melica ciliata* and *Carex caryophylla*. Although there is no real summer drought a constant irrigation for the Green Roof was installed to be on the safe side. Snowfall and temperatures near freezing point are not exceptional for the winter season and the central point of the shopping square, which features a water fountain in summer, can be used as a skating rink in winter.

Special emphasis was also placed on the energy concept of the building. Most of the energy for heating and cooling is provided by geothermic energy facilities. The system is one of the largest ever installed in Europe with more than 200 pipes. Each of the geothermal drillings reaches 150 m in depth. As a result the total length of the pipes adds up to more than 18 kilometres. By implementing the use of geothermal energy the investors will cut down their energy supply by more than 1.3 million kWh per year. In carbon dioxide units this means a saving of 350 tons CO₂ per year.



Forward-looking and efficient: The natural roofscape design of the London architect group FOA

By providing the investor and the environment with a yield in an ecological and economical way the Green Roof and the geothermal system will soon pay for themselves.

Wolfgang Ansel, IGRA

Sustainable stormwater management with Green Roofs: FiftyTwoDegrees Nijmegen

The FiftyTwoDegrees project in Nijmegen was designed by the Dutch Mecanoo Architects of Delft. Visual eye-catcher of the project is, of course, the 'bent' tower with a height of 86 m and an office space of nearly 20,000 m². However the future-oriented spirit of the FiftyTwoDegrees starts in the basement with a creative stormwater management system which integrates the water retention capacity of the multi-functional Green Roof. The sloping grass roof of approx. 7,000 m² was installed by the Dutch Green Roof specialist Van der Tol for Ballast Nedam Special Projects.

One of the demands of the Nijmegen municipality and the Rivierenland district water board is that water originating from the roof surfaces of the FiftyTwoDegrees project must be drained/infiltrated into the soil inside the grounds of the building. The rainwater may not be discharged into the public sewer system.

As the FiftyTwoDegrees building leaves little open space in the grounds for water to infiltrate, it was decided to have the water infiltrate the soil under the building by using a perforated pipe system into which the rainwater from the roofs flows and from which it is then able to infiltrate



Ecological center-piece of the FiftyTwoDegrees project: the 7,000 m² grass roof

the soil. Engineering firm Royal Haskoning drew up the calculations in relation to the required capacity of the infiltration pipes and these are based on the rainfall duration line, the infiltration capacity of the subsoil, the soil study of the underlying soil layers and the discharge reduction of the Green Roof. The calculations show that an initial retention capacity must be realised of at least 25 mm/m² surface. For the hard surfaces, this means that the load on the infiltration system will actually be 25 mm. For the grass roof it is assumed that out of the required 25 mm buffer, only 5 mm will reach the infiltration facility. The remaining 20 mm buffer should be found in the roof garden system. The grass roof package of the FiftyTwoDegrees project contains 25 cm of intensive substrate, a system filter, a drainage element and a protection mat.

Calculation:

Water originating from hard roof surface:
4,500 m² x 25 mm = 112.5 m³

Water originating from grass roof:
6,800 m² x 5 mm = 34.0 m³

Total capacity of infiltration pipe: 146.5 m³

According to the measurements, the discharge reduction of a fully-saturated Green Roof build-up can still reach 40% of a subsequent rainfall. In the event of 25 mm/day rainfall, 10 mm (68 m³) are retained in the roof garden system. The remaining 15 mm will drain to the underside of the roof. This is 10 mm more than the amount determined by the engineering firm and it was therefore necessary to provide an additional facility in the form of an extra, large gravel chamber to bridge the difference. If the roof was flat instead of sloping, or if there had been a thicker substrate layer than is now the case, it would of course have been possible to buffer more water.

The path followed by the rainwater on the grass roof is as follows:

In the first instance the water is buffered in the substrate layer and then in the drainage-buffer layer of the roof garden system. After these layers are saturated, water drains to the eaves following the declining slope of the roof. After reaching the eaves, the water is buffered in the gravel chamber where it has the opportunity to infiltrate. If the amount of precipitation is such that it cannot infiltrate the subsoil quickly enough, the excess will be discharged through an overflow to the infiltration pipe under the building.

Olivier Copijn, ZinCo Benelux

Set a good example:

Waitakere City Council Green Roof in New Zealand

Waitakere is known as the Ecocity and is part of the Auckland Region. The city council is particularly passionate about the environment, sustainability and finding new ways to minimise the 'footprint' on the environment yet encourage sustainable economic development.

Consequently the new council complex was built with water conservation, collection and reuse, energy efficiency and experimentation with new technologies, waste minimisation and recycling in mind. For many years the administration has been telling New Zealanders and the world about sustainable practices and now it is time to show them via the systems and design of our buildings.

The Green Roof on the top of the civic wing covers an area of around 500 m². Its purpose is two-fold: it acts as an insulation system for the roof, providing a barrier to heat loss during winter. Secondly it retains stormwater within the soil substrate and then naturally releases the water over a prolonged time, reducing the load on the local stormwater system during storm events. The quality of the water is naturally filtered by the substrate which is made up of special clay pellets with groundcover plants growing on top. The plants

are New Zealand natives chosen for their ability to withstand drought conditions.

This ecosystem is being monitored by Landcare who are collecting data on its performance, rainfall, as well as insects and plants which attempt to establish themselves on this roof. The roof is barely one and a half year old and it is hoped that monitoring will assist the development of a template for future installations in New Zealand. For more information please contact or visit the website: www.waitakere.govt.nz



After installation: The native plants are designed to be low and slow-growing

Frances Harrison, Public Affairs Advisor
Waitakere City Council

Practical considerations when specifying rubble/brown/biodiverse living roofs

Is brown the new green?

The term brown roof was first used by living roof experts to differentiate rubble based designs from the better known sedum blanket type extensive Green Roof. Whilst a number of these brown roofs have been successfully completed, a wide range of issues need to be addressed in order for brown/rubble roofs to be practicable. Designers and planners need to give careful thought to the specification, design and installation of these roofs in order to avoid making costly mistakes and to ensure that all their objectives are met.

Problems to overcome

One of the main problems of a rubble/brown roof arises from the use of site soil and substrate. Firstly, it is illegal to simply put site substrate/soil on a roof without having it tested for contamination. Even if it is not contaminated the substrate will still need to be processed/sieved to remove metal and glass objects. It will almost certainly contain seeds of unwanted plants as well as other unknown deleterious elements and a structural engineer will also require the substrate's saturated weight which is difficult to ascertain accurately with a constant material, never mind an arbitrary mix of elements. Therefore, before deciding to use site substrate, specifiers need to ask who is going to finance the processing of the soil to meet the above requirements. Assuming these hurdles are overcome, the next question is who is going to warranty the substrate ensuring that it will not compromise the integrity of the building and that it will support the vegetation required to attract the targeted wildlife.

The good news is that these problems can be addressed. In environmental terms, the ideal may be to re-use substrate from the building site for the roof; however, a much more practical and feasible solution is to use a substrate manufactured from recycled materials to a recognised environmental standard and specifically designed and warranted to support the vegetation required.

Letting nature take its course?

The self-sowing of vegetation on a brown roof may be the most desirable environmental objective, but in reality it just may not be feasible. For example, owners need to consider if they will be happy to have paid for a Green Roof with possibly little or no vegetation coverage for years. Equally not all naturally self-seeding foliage is desirable; will the roof build up cope with the invasive root systems of some plants? Giving nature a helping hand by planting the required plants or seeds is the obvious solution.

Specification advice

Any building component such as a Green Roof needs to be described in detail. The contractor needs to know its type, the depth and distribution of the substrate, the species of plants required, details of the drainage layer and the filter sheet. Any essential habitat items also need to be specified – does the roof require shingle or dead tree branches to promote a habitat for particular inhabitants, for instance? The input of a recommended ecologist as a consultant is a good idea.

Like any other type of Green Roof, a brown/biodiverse Green Roof should be developed to be an integral part of the building design, rather than an “add on” to attract wild life. Apart from the landscape, the designer also needs to consider other options required to maintain and compliment the integrity of the building below whilst supporting the landscape. Issues to be considered include:

Feasibility: Is a brown/biodiverse roof actually even feasible on the building? Height, exposure to wind, sun, and rain need to be considered and structural loading always has to be taken into account. Is the wildlife previously happily living at ground level around the building, going to be happy at a high level?

Waterproofing: A top quality waterproofing system, designed to work with a living roof, incorporating integral root barrier, is essential. No one will thank you for saving the environment if their roof leaks!



Stormwater retention: A moisture retention layer and water retaining drainage system will help reduce water run off, and probably reduce the required number of outlets. Improved water retention gives savings that offset the cost of the Green Roof and the retained water helps the plants.

Drainage: If there are adjacent roofs draining onto the Green Roof and/or there is cladding producing high rates of rainfall run off, a drainage layer with a high flow rate is probably required beneath the landscape.

Aesthetic appearance: Among any group of Green Roof specialists there will be debate about what a brown/biodiverse Green Roof should look like. Unless the required landscape is clearly defined at the outset, the client is likely to get the cheapest option and invariably this is not what they expect or want.

Maintenance: A requirement of the contractor who is installing the Green Roof, to include the cost of post-installation maintenance for a period of at least two years in his tender, will go a long way to ensuring the client achieves his aims.

There are many reasons for choosing a Green Roof – or a brown/rubble roof – for a building. Taking the lead in ecological responsibility will give increasing payback as the penalties for causing environmental damage grow. However, as with any aspect of construction, a brown roof needs careful design and specification.

Helen Cole, Alumasc Exteriors

About to go:

Green Roof policies in the UK

Sheffield City Council promotes Green Roofs

Sheffield has become the first planning authority, outside greater London to make the bold step of taking a Green Roof policy to Council for incorporation into planning regulations. The policy is currently out for consultation and will benefit from the support of interested parties.

The preferred option at a glance

'National planning policy states that local authorities should promote resource and energy efficient buildings, the sustainable use of water resources, and the use of sustainable drainage systems in the management of run-off. Green roofs can help to achieve all these objectives.'

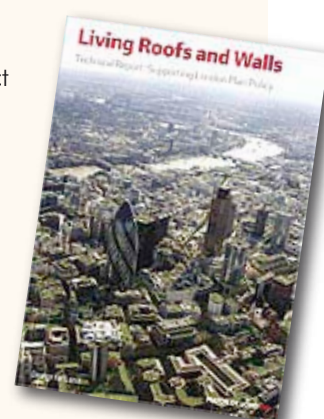
Green roofs will be required on all medium and larger developments, and encouraged on all other developments, provided they are compatible with other design and conservation considerations. The Green Roof must cover at least 80 % of the total roof area.'



Living Roofs Technical Report launched at Ecobuild, London

Ecobuild 2008 saw the launch of an important new Technical Report on Living Roofs and Walls researched on behalf of the Mayor of London and sponsored by Alumasc Exterior Building Products. The Technical Report has supported the development of a new Living Roofs Policy in the London Plan which will promote the adoption of Living Roofs across London.

The policy states that the Mayor will, and boroughs should, expect major developments to incorporate living roofs and walls where feasible. It is expected that this will include roof and wall planting to deliver a number of objectives including accessible roof space, adapting to and mitigating climate change, sustainable urban drainage, enhancing biodiversity and improved appearance. Boroughs should also encourage the use of living roofs in smaller developments and extensions where the opportunity arises. The document features several case studies and a wealth of useful information. A PDF copy of the report is available for download from the GLA web-site www.london.gov.uk and from Alumasc at www.alumasc-exterior.co.uk. A printed copy of the report is available by contacting the Alumasc literature hotline on 0808 200 1008.



Upcoming events



World Green Roof Congress 2008
United Kingdom, London,
17 - 18 September 2008

Livingroofs in partnership with CIRIA, EFB and IGRA are pleased to announce the 2008 World Green Roof Congress, to be held in London on the 17 - 18th September. This is the first event of its kind to showcase Green Roofs in the UK.

Conference: The two day conference will discuss the challenges and opportunities faced when implementing Green Roofs. It will focus on the contribution that Green Roofs can make to sustainable urban regeneration, climate change adaptation, sustainable stormwater management as well as improvements to local biodiversity and quality of life within cities. The conference will highlight latest innovations and research to support the effective promotion and delivery of Green Roof solutions as well as demonstrating examples of good practice from the UK and overseas.

Field trips: Local field trips will be organised to demonstrate what has already been achieved in and around London. This provides an opportunity to see how Green Roofs contribute to sustainable development and green buildings.

Workshops: These will bring together leading academics, policy experts and practitioners in green buildings to discuss options and approaches for progressing the Green Roof agenda. To find out more visit www.worldgreenroofcongress.com

IGRA members will receive a special discount on all congress services.



Expo Zaragoza 2008
Spain, Zaragoza
14 June - 14 September 2008

There are just two months left until the start of the Expo Zaragoza 2008. The event, in the fifth largest Spanish city, is all about 'Water and Sustainable Development'. For Green Roof enthusiasts the Expo in Zaragoza delivers a very special attraction. The participants pavilion (61,667 m²) is covered by a Green Roof which is accessible for visitors and offers wonderful views over the landscape and the Ebro river. For more information, please visit the official website:

www.expozaragoza2008.es

World Congress of Agricultural Engineers and Agriculture Professionals 2008
Spain, Madrid
28 - 31 October 2008

Agricultural engineers are playing a prominent role as technical and scientific links for the balancing of environmental preservation, rural development and food demand.

Hence it is not surprising that the World Congress of Agricultural Engineers takes up the subject of Green Roofs under the title 'Green cities and landscape' within the afternoon session on the 28th October. The different presentations will cover 'Green Cities and Ecological Roofing', 'Urban and Periurban Agriculture' and 'Gardening and Landscaping'.

For more information please visit:
www.congresomundialagronom2008.org/uk/



IFLA Congress 2008
Netherlands, Apeldoorn
30 June - 3 July 2008



The 45th World Congress of the International Federation of Landscape Architects (IFLA) will cover the theme '*Transforming with Water*' in full width, breadth and depth. Each of the three days has its own central theme to focus the activities of the day. The program offers a mix of keynote speeches, lectures, debates, excursions, workshops, master classes, an interactive forum, and social events.

IGRA will present '*Natural Stormwater Management with Green Roofs*' in the framework of a panel session. Program and registration: www.ifla2008.com

International Green Roof Congress 2009
Germany, Stuttgart-Nürtingen
25 - 27 May 2009

In Spring 2009 IGRA will deliver the 2nd International Green Roof Congress in Stuttgart-Nürtingen. The congress will place special emphasis on the use of Green Roofs within the area of urban planning and will feature amazing Green Roof projects from all over the world (e.g. Expo2008-Zaragoza, Canary Wharf-London, Fusionpolis-Singapore). Details will follow shortly – stay tuned!



International Green Roof Congress
25 - 27 May 2009
Nürtingen/Germany

A free international community resource: **The Greenroof Projects Database**

Based in Alpharetta, Georgia, USA, Greenroofs.com is the international greenroof industry's resource and online information portal. We inform, promote and inspire through the interchange of ideas, projects, news, events, research, community and organization updates, and marketing opportunities; exclusives include Forums, contributing editor columns, guest features, classifieds, and our new 'Greenroofs TV', a video channel devoted to greenroofs.

Increasingly, high performance buildings, green design practices, and sustainable technologies are becoming major architectural influences and are now setting standards within the international construction industry. Greenroofs are fast becoming green staples of chic sustainability in mainstream architecture and high performance building! Greenroofs are vibrant and exciting alternatives to the average hot, barren roof, and with the advent of satellite imagery such as Google Earth and Google Maps, greenroof architecture is literally becoming transparent on a global basis.

In this spirit, Greenroofs.com publishes 'The Greenroof Projects Database' and our goal is to compile an open, comprehensive body of global greenroof projects as a research and marketing tool to help promote greenroofs worldwide. With so many greenroofing companies and organizations in the marketplace, the idea is to have one place for readers to search for greenroof projects, with credits and links to the original design and information sources.

The Greenroof Projects Database is searchable by multiple fields with many pull down menus, including Project Name; Location; Project Year (Year Built or Current); Building Type (Application Type, Greenroof Type, Greenroof System, Test/Research); Keyword (Words or Project ID #); Roof Properties (Roof Size, Roof Slope); Accessibility; and Designer/Manufacturer of Record (Name or Company). Each defined search displays the project names, the total number of projects, and the area queried in square feet and meters squared. Click on each project name to see the project profile's color brochure.

Each project profile provides a background and design overview with up to eleven photos and/or graphics, and lists contact information to learn further about each particular project and the service and product providers. Each project profile acknowledges the company or organization who submitted the information by displaying their logos on top. All industry associations, organizations, universities, companies, governmental bodies, and individuals are invited to participate, highlight your project, and share your experience!

Benefits & Features

Informs prospective clients, product specifiers, designers, allied professionals, researchers, students, the media, and more. Greenroof project info from around the world is available in one central repository with links to submitter and other stakeholder websites, with contact information.

Promotes industry networking with established and emerging companies & technologies, as we learn from one another. For example, specifiers can search by Designers/Manufacturers of Record to find experienced providers, contractors, landscape architects, and engineers.

Allows quick and easy data queries of specific searches. Define and narrow your search by completing the appropriate fields and/or selecting choices from a variety of pull down menus.

Displays profiles in multiples languages: English, German and Spanish, with more planned.

Highlights industry leaders. Get your logo prominently displayed at the top of each project profile submitted in recognition as the "Information Partner."

The Greenroof Projects Database continues to grow as project profiles are received, verified and entered into the system. Submit yours today using the easy online form! We welcome all reader feedback and ideas on how to make this free international community resource even better. Search 'The Greenroof Projects Database' and learn more here:

www.greenroofs.com/projects/

Linda S. Velazquez,
Greenroofs.com Publisher/Editor



The next IGRA-newsletter will feature the following topics:

- Green Roofs and Photovoltaics: Planning and application
- Natural Stormwater Management with Green Roofs
- World Green Roof Congress 2008 in London
- International Green Roof Congress 2009 in Stuttgart-Nürtingen

Publisher

International Green Roof Association (IGRA)
PO Box 88 01 27
13107 Berlin – Germany
e-mail: info@igra-world.com
phone: +49 (0)30 47 47 67 89
web: <http://www.igra-world.com>

Editor

Wolfgang Ansel
ansel@igra-world.com

The International Green Roof Association (IGRA) is a global network for the promotion and dissemination of Green Roof topics and Green Roof technology.

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