

RCI Region 6

REGION SIX PRESENTS GREEN ROOF WORKSHOP TO PACKED HOUSE IN SAN FRANCISCO

By John D. Shepherd, RRC, RRO, RCI Region Six Director

August 6 2001: Eighty-two people attended the Roof Consultants Institute Region 6 “Green Roof Workshop” held in San Francisco at the Ramada Inn Airport South. Every aspect of the emerging green roof industry was represented at this meeting, and included roofing and waterproofing consultants, landscape architects, contractors, government officials, energy consultants, and college students. This was by far the largest group to attend a region six meeting in many years.

So much information regarding “Green Roofs” was covered at this intensive one day seminar that that I will not be able to address everything in this article. A few of the highlights and main points of each presenter include the following:

Introduction to Green Roofs (Steven Peck)

Mr. Peck presented an overview of the Green Roof industry and started off talking about some of the problems (air quality, heat-island effect, storm runoff and strains on the public infrastructure) that have lead local, state and federal governments to consider alternative roof designs that could mitigate these problems. What was most encouraging to me was that there are so many different styles, designs and materials available for use on a green roof that a green roof system could be installed as part of a retrofit project with only minimal structural upgrades to many existing buildings. Of course costs and upgrade requirements will depend on what the substrate is and how it was designed, as well as the overall system installed, including type and depth of the soil, plant selection, and whether it includes plaza and walkways for foot-traffic.

Some of the benefits of green roofs addressed in this program include reduced heating and cooling costs, extending the life of a waterproof membrane to 40 years, reduction in fire risk to roof, and provision of additional public use space.

Mr. Peck also pointed out that there is a lot of work to do in bringing awareness about the environmental and financial benefits of green roofing to both the general public and those who work in the design and construction industries. This could be achieved through a combination of ways that would include conducting studies to verify the benefits for specific cities and/or regions of the US, encouraging government support and promotion of the green roof concept through tax credits and incentives, developing efficient ways of exchanging new information about research findings, e.g., plant and soil selection, and choices in waterproofing systems.

Setting the Standards: Incentives that Drive the Market (Tom Liptan, ASLA)

The focus of Mr. Liptan’s presentation was on what the City of Portland, Oregon was doing to promote the use of Green Roof systems in the Portland area. Portland’s interest in Green Roofs is driven primarily by the stormwater reductions that occur when building owners install green roof systems. The aesthetic values of roof gardens and the reduction in fire risks to buildings with green roofs was also appealing to the city.

In order to quantify the costs and benefits of green roof systems, the City of Portland is currently studying the results of several ongoing demonstration projects. The early results of the demonstration project appear to indicate that proper soil and plant selection are the key components to improvements in the city’s stormwater management system.

Portland is also promoting the green roof concept by providing tax credits and density credits for property owners who install green roof systems on their buildings. Additionally, they have simplified the permit process by clearly identifying what the steps are in order to obtain the required building permit for a green roof (have a structural engineer verify loading capabilities of the roof and what is required, if necessary, to raise the structural capabilities of the building).

Waterproofing System Selection, Design and Analysis (Ken Klein)

Mr. Klein introduced the attendees to the various types of roofing and waterproofing materials and systems that have been successfully used in green roof assemblies. He followed up with an overview of the key performance criteria to look for when evaluating a specific membrane and/or manufacturer. Performance criteria that was deemed most important included the following: durability, low water absorption, proven performance history, and that the membrane is a component of a system designed (by the manufacturer) to be used as a buried roof membrane.

Both thermoplastic single ply systems and a variety of multiple-layered roof systems seemed to perform very well when used in green roof assemblies. However as the membrane used in a green roof system will be expected to keep water out of a building for 40 or more years, the key to successful overall performance of the selected waterproofing system was the quality of the actual installation of the waterproof system. Full-time inspections (by qualified individuals) of the waterproofing system installation also play an important part in the final performance of the buried membrane.

Mr. Klein also reviewed the consensus design standards that are applicable to waterproofing systems. These standards included ASTM C981, ASTM C898, ASTM STP 1084, the Architectural Graphic Standards, and the NRCA Roofing and Waterproofing Manual.

Defending a Green Roof: Detailing of the Waterproof Assembly (Gerson Burs)

The program presented by Mr. Burs focused on seven threats that affect the performance of a waterproofing system when used as part of a green roof assembly. These threats included premature failure of the membrane, drainage problems, roof traffic, environment, neglect, gardening and fire.

To reduce the risk of premature failure of the waterproofing system Mr. Burs had five recommendations: Go with proven technology in membrane selection, think defensively when preparing details, select an experienced contractor, conduct inspections throughout construction, and conduct flood testing of the completed waterproofing assembly.

Six recommendations to reduce problems associated with the drainage system included the following: Slope to drain both the roof deck and the gardens, use a lot of open drainage channels, install large drain bowls as they are easy to clean, design adequate drain capacity, consider the type of irrigation system to be used in the garden, and conduct regular and routine maintenance to the drainage system.

When it came to roof traffic Mr. Burs had two key recommendations: Locate walkways in places that can sustain the roof, and determine whether safety tie downs are required and plan for their use in the system design.

To reduce environmental related failures of the waterproofing assembly Mr. Burs had four recommendations: Consider the ph of the soils and plants to reduce the risk of organic rot to the assembly, determine the effect that both summer (sun exposure and heat) and winter (freeze/thaw) weather conditions will have on the system, determine potential exposure of the membrane to vermin and plan to protect the membrane from teeth and claws, and address insect related problems by using treated wood and termite barriers.

Two key recommendations to reduce the possibility of neglect to the waterproofing system included educating the owner and conducting follow ups with the owner to verify upkeep of the waterproof system.

When it came to gardening there are two issues to consider in both the design of the system and for the follow up maintenance: what type of chemicals (fertilizer, insecticide, etc.) will be applied to the garden, and the type of tools that will be used in the garden. A barrier or marker of some sort would be key to reducing damage to the membrane by the gardeners.

Mr. Burs had three recommendations that should be incorporated into the green roof assembly to reduce the risk of fire. These included installing gravel or stone along the perimeter edges, using fire tolerant plants where possible, and making sure that the irrigation system can be used as a back-up to put out fires.

Landscape Design: An Illustrated Overview (Theodore Osmundson, FASLA)

Mr. Osmundson started his presentation by reminding us that roof gardens have been with us for thousands of years. Ancient roof gardens include the Hanging Gardens of Babylon, the Roman Gardens in Pompeii, the garden of Pope Pius II, the Lucca Guinigi Residence and the roof gardens at the Astor Hotel in New York City.

Mr. Osmundson's photographic tour of roof gardens from around the world included pictures from Germany, Italy, Japan, China and the United States. His presentation included many of the photographs that are in his book "Roof Gardens: History, Design and Construction."

Included in this presentation was a brief discussion on the various types of soils and fills that can be used in the roof garden.

Plant Selection and Maintenance (Paul Kephart)

The focus of Mr. Kephart's presentation was on creating a sustainable roof garden through proper plant selection, design, and application.

When designing the roof garden there are many things that can affect the outcome of the completed roof garden that must be considered. When selecting plant materials, items to ask are: What are the client's expectations and desires for the roof garden; How does the climate affect plant selection; What are the ecological effects of the plant selection; What are the maintenance requirements of the plants, How does the building design affect the profile of the garden (is it visible from offices, plaza areas, etc.); What is the loading capacity of the roof; and What is the soil depth.

The loading capabilities of the building will affect the type of soil selected and the depth of the soil. The type and depth of the soil affect the type of plant materials that can be selected. When retrofitting an existing building, these items can place limitations of the design of the roof garden. However, for a newly constructed building that includes the landscape architect's specific vision for the roof garden, soil depths and plant selection will not be hindered by loading limitations.

Selecting plants from native materials will allow a roof garden to perform with little water, maintenance, and nutrients. Utilizing an ecological approach when designing a green roof will integrate the roof garden with nature, providing diversity, aesthetics, and habitats not otherwise available in the urban world. The energy savings from the roof garden will be further enhanced by the reduction in water use, while the environment will be enhanced by reducing the amount of fertilizers that drain into the storm runoff system.

Mr. Kephart stated that accurate record keeping, maintenance and updating of plants is key to the long-term health of the roof garden.

Case Studies: Green Roofs with Rubberized Asphalt or Thermoplastic Waterproofing Systems (Charles Cronenweth and Peter D'Antonio)

The presentation allowed manufacturers of two of the most common waterproofing systems used in the Green Roof Industry (single ply thermoplastic membranes and rubberized asphalt waterproofing) to showcase several high-profile roofing projects.

Mr. Cronenweth's presentation from American Hydrotech, Inc. included a review of three projects. The projects included the Gap Building (San Bruno, CA), the Latter Day Saints Conference Center (Salt Lake City, UT) and the Vancouver Public Library (Vancouver, BC, Canada). Each of these projects used a rubberized asphalt waterproofing system.

Mr. D'Antonio's presentation from Sarnafil Roofing and Waterproofing Systems also included a review of three projects. The projects included the Chicago City Hall project, the Chiropractic Center Project, and the Ford Motor Company Premium Automotive Headquarters Facility currently under construction in Irvine, CA.

Concluding Remarks

The enthusiasm visible at this Green Roof Workshop told me that there is a lot of interest in the Green Roof concept and that this could be the calm before the coming storm. I think that it is important for us in the roofing and waterproofing industry to start learning more about this growing field so that we can become leaders in the green roof field and not followers.

RCI Region Six wants to thank all who helped make this program such a success, including the speakers, the exhibitors, and especially the attendees. A special thanks to Haven Kiers for giving me a copy of the extensive notes she took during this meeting.

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