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Green Roofs… What Did We Forget to Ask?

by Robert Kravitz

Although a green roof can eventually pay for itself by reducing heating and cooling needs and by providing other benefits, these only occur if the roof is properly maintained. This usually involves several steps: pre-installation consideration and proper preparation for the green roof; maintenance requirements for the first 30 to 90 days after the roof has been installed; and ongoing attention thereafter.

How do you maintain a green roof? In the rush to go green and incorporate as many environmentally responsible measures into buildings and building construction as possible, surprisingly, this question often is not raised until the green roof has been installed.

And this can be a very serious mistake. Although most green roofs are designed to be weather-tolerant and low-maintenance with relatively long life spans, they do need some regular care, occasional repairs, and maintenance — especially when first installed. And when you consider their costs — a green roof can cost as much as two times that of a conventional roof — it becomes even more imperative that the proper maintenance needs of a vegetative roof be understood.

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Check the Roof, Check the Weather, Select the Plants

Before any planning or work can begin on a pre-existing building, a contractor or engineer must be brought in to guarantee the structure can support the green roof. The “wet weight” of a green roof, one that has been saturated with rainwater, can range from 15 to as much as 50 lbs. per square foot. That can be more than an existing structure can safely support, which would potentially jeopardize the structural integrity of the entire building.

Additionally, some type of irrigation system may be required to ensure proper plant rooting and survival. Although a green roof’s ability to reduce storm water runoff — decreasing the amount of contaminated water running off buildings, streets, and sidewalks into local treatment facilities — is a key benefit, there will still be runoff once the soil has become saturated.

And a final pre-consideration is selecting plants and growth media, or soil, to be used for the installation. Through the past decade, engineered soil has been developed to help ensure the vegetation on green roofs not only survives, but also thrives. The soil is pH-balanced for the plants selected and composed of aggregates, micro- and macronutrients, organic matter, soil moisture properties, and other characteristics that help promote vegetation survival. The engineered soil is also tailored to the climate and vegetation selected for the green roof.

Speaking of vegetation, there are literally hundreds of types of plants that can be selected for a green roof. These include grasses, succulents, mosses, perennials, sedums, and other plant possibilities. However, it is relatively easy to recognize that the types of plants selected for a green roof atop a building at the University of Texas in Austin, for instance, which has a relatively warm climate, would likely not be the same type of plants selected for a building at the University of Chicago, which has more diverse and extreme seasons.

Dry and wet conditions, extremes of heat and cold, wind, and other factors all come into play and must be considered when selecting rooftop vegetation. Selecting plants that are considered native to the area is often the best choice.

Timing is also an issue. It is usually best to install a green roof between the months of April and October. In southern climates, which typically have a longer growing season, that window for installation can be

extended. However, it is better to avoid installation when it is too cold, during heat waves, excessive rain, or during a prolonged dry period.

Immediately After Installation
The most intense care and attention required for a green roof is usually during the first 30 to 90 days after the roof has been installed. One task that is key is irrigation — either in the form of an installed irrigation system, or what is often more likely, hand watering. Some experts suggest extending this irrigation period beyond 90 days to cover the first few months after the roof has been installed. Of course, much of this depends on the climate and weather conditions.

What is important is to keep the soil moist. Usually this requires some sort of irrigation at least twice a week in the absence of any natural precipitation. The vegetation should be allowed to adapt to its environment by slowly decreasing the watering frequencies, extending them to once per week, then every couple of weeks, and then monthly. The objective is to get the vegetation to become self-sustaining within the first six months to a year after installation.

And just like in other types of gardens, some weeding will be required. Some facility managers may believe that as long as some type of vegetation is growing on the roof, selected or unwanted, the benefits of the roof will still be achieved. However, if weeds and other undesirable vegetation take hold, the chances for failure of the green roof increase. This occurs for a variety of reasons:

- Weeds are generally annual. Once the season has passed, they will die off, leaving the soil exposed.
- Weeds are typically not as drought-tolerant as the plants specifically selected for the green roof.
- The roots of weeds can be quite aggressive, depleting moisture and nutrients necessary for the intended vegetation.

Typically, weeding is most necessary the first two to three growing seasons. Some green roof manufacturers and installers will provide plant guides with pictures so maintenance crews can better determine which plants belong on the roof and which are weeds and should be removed.

Long-Term Considerations
In most cases, roofs in general, along with green roofs, are rarely visited by building occupants. However, a regular patrolling schedule needs to be established once a green roof has been installed. This involves removing paper, debris, and other items that may be on the roof, which can harm the plants.

Additionally, in some cases the vegetation may need to be trimmed. Leaves and branches, depending on plant selection, may need to be cut back. Further, some green roof systems may benefit from or require the annual application of slow-release fertilizers.

In anticipation of different seasons, other more structural issues may need to be considered. For instance, the irrigation water lines may need to be drained so they do not freeze in the winter. In spring, the same lines must be checked to be certain they are working properly.

Although the importance of plant selection has already been mentioned, even with the best pre-installation planning, some plants will likely not survive. This means that another seasonal duty should include removing dead plants and replacing them. Typically, this is performed during the spring and summer months.

Overall, if the steps discussed here have been implemented, especially the pre-installation considerations, a green roof is designed to and will last for many years with minimal attention. However, they cannot simply be ignored once they are installed. The long-term energy and environmental benefits of green roofs are now well documented. Care and attention on an ongoing basis ensures that these rewards are achieved.

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