





Green Roofs: Fixer-Upper or Lawsuit? Sloped Extensive Green Roofs.

In recent years we have received more and more calls from building owners that have "issues" with their green roof. At the same time, it is astonishing that green roofs designed, built, and maintained according the FLL Guidelines have not had any problems. Obviously green roofs that don't meet these criteria in design, installation, and maintenance are more likely to fail. Sometimes failures are not very visible for building owners because they don't have other green roofs to compare too. However for us, with more than 30 years of green roof experience, it is rather easy to find evidence for failures in a short time. It may be hard to believe, but there is nothing in the North American green roof industry that hasn't been done before somewhere else in the world. In this article we focus on sloped roofs where we find typical beginner problems and issues can be very expensive.

Some of us may remember the big headlines last winter. A large green roof in St. Charles, IL collapsed! It was supposed to be the largest sloped green roof in the country and during extreme heavy snow fall the roof simply came down. Luckily nobody was hurt, but the damage was devastating. Everybody blamed the snow. Meanwhile the real cause was ignorance in design, installation, and maintenance. This potentially fatal and multi-million dollar collapse could have been prevented if proper design practices had been implemented. As I looked at the satellite pictures (bing.com) prior to the collapse, the problems became very obvious and manmade.



On the lower part of the roof, it is easy to identify erosion – water erosion. It was exactly this part of the roof that collapsed. Shown above, there is too much water that is not being properly handled by a drainage system. Snow is nothing but frozen water and when you have too much water in certain areas in summer you have too much snow in winter. It is as simple as that, and it is not acceptable when no one feels responsible for this amateur design.





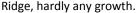
In my opinion, all parties involved in this green roof design, especially the "experts", construction and maintenance should pay for the damages. Had there been people killed we would have all heard this in conjunction with construction manslaughter. I estimate the damaged to be around 5 million dollars.

"When they reuse the collapsed material for new construction, I am sure they can get a higher LEED rating because everything is locally sourced." - Jorg Breuning

A few thousand miles away at the Library of Congress Packard Campus, Culpepper, VA a law firm achieved a \$20 Million litigation settlement involving the failure of a green roof system for an ENR top 10 contractor. In short, the erosion of the growing media cause severe damaged. The growing media was not blended according FLL guidelines and as a result most likely did not provide proper nutrients for plants or proper drainage for the roof. Unsuitable and compromised plant selection (focused on native plants and not plants specifically suited to a roof-like environment) increased the problems dramatically. Comparable "landslides" on sloped green roofs are very rare in countries that have been building green roofs for decades. Ignoring pre-determined guidelines for these types of roofs is inexcusable. Let's put this project in the "wasting our tax money folder" and the most expensive failure in the green roof industry around the world! The hunt for superlatives goes on.

Just an hour from our office we received a call to evaluated the extensive green roof at Montgomery Park, Baltimore, MD. This is one of the oldest green roofs in the country, but designed, built, and maintained extremely poorly. As a result of a bad design not only were the plants struggling but the roof drains were also clogged. Even the insulation of the inverted roof was in some areas exposed, destroyed, or even completely gone. As a building owner I would call this a nightmare especially when suddenly all these colorful promises of long-term warranties from roofing manufacture don't cover the damage. When shopping for a green roof is sure to read and understand every last detail of both the roofer and green roofer's warranty.







Erosion. Insulation exposed



Organic at the bottom



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Ridge: only a little media left

Water and wind took everything away

Luckily for the industry, the building owner didn't realize the entire scope of the damage and we were able to create an action plan that would allow a good recovery in the years to come.

The initial green roof design, materials, and details did not meet FLL guidelines. There are massive areas where wind and water erosion of the growing media have occurred removing any base that might have sustained plant life. This particular blend of growing media was one of the worst blends I have ever seen. It is simply trash and has very poor drainage creating a very unsuitable environment for sustainable growth. All these facts are considered in our new action plan.

Less than 10 minutes from our office we have been observing a green roof on the Harford Community College - Joppa Hall. At this location there are two sloped green roofs. One green roof is facing west and one is facing south. Since both green roofs are built exactly the same way, the south facing green roof has a hard time to sustain plants. The design, growing media, drainage, and plant selection does not consider the different orientation or the fact that it is on a sloped roof. The drainage layer (drainage board) is actually drifting toward the lower part of the roof. This is not acceptable and is a typical beginner failure in design, installation, and maintenance. Without proper action this roof will not get any better and nor will the image of extensive green roofs.







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Green Roof Service LLC's division Green Roof Technology would have designed all mentioned projects according the FLL guideline – without long-term problems for the building owner. We are simply focused on long-term reliability and efficiency.

Short term profits, desperate search for references, and craving for recognition is not part of our philosophy. Green roofs are not high-tech and high-tech won't help to fix or avoid problems. Sloped green roofs in particular require a decent amount of practical experience, common sense, and should not be trying reinventing nature as opposed to copy nature. Fancy components that "in theory" shall keep the soil in place when the soil is wrong to begin with does not help or repair the situation. Two wrongs things don't make one right product.

It is obvious that on all the mentioned projects the involved people didn't understand what they were doing. In Northern America it is difficult to find real expertise in the living systems/structures field especially with the "green" boom. Suddenly everybody is green somehow – behind the ears for sure (which is the German translation for "wet behind the ears"). However, the people who did these projects that failed claimed to have some sort of qualification. Whatever qualification they had - it was not the right one – but I am sure they are still called "experts" today....

In general we can see an increasing number of problems on green roof all across the country and an increasing number green roof that almost completely fail. In our – not representative research –we found a surprisingly high number of problems that where designed by landscape architects. Even the ASLA green roof is partially replanted and has deficits in the performance, and that is not even talking about the cost of repairs. We also see this profession utilize more and more modular, tray, or planter systems believing that problems might be less with this system. Unfortunately, we will soon discover the opposite to be true.

We find it extremely important to talk about this topic rather than hide it because these issues will slow down the industries growth if these poor practices are ignored and allowed to continue (we had that happen in Germany 20 years ago). With our background and knowledge we see it as our responsibility to educate people about this increasing problem, the potentially fatal consequences, and solutions for success. We don't want to handle this topic delicately because the financial damage is too great and need to keep people safe too important. Perhaps the industry needs a "green roof doctor" to evaluate the quality of the so called experts? This seems at least better for the industry than developing green roof repair kits or reinventing the already reinvented modern green roof technology.

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