

## Roofing

# What To Do With a Failing Roof

How to determine whether a recover or a replacement is the savvy choice for a low-slope roof

By Daniel L. Bishop

**A**n unfortunate truth is that building occupants only seem to appreciate a roof system when something fails. The roof is a burden maintenance and engineering managers must grapple with when the existing roof system is reaching the end of its life span or in the unfortunate occurrence of a leak.

Ideally, building occupants can ignore an appropriately designed, properly installed, and well-maintained roof system, assured that it will perform as needed and keep the building dry.

Recovering a roof is far less labor- and cost-intensive a process than replacing a roof and is a logical point of consideration to start. When evaluating an existing roof system as a candidate for a recover, managers need to review a list of items that includes:

**Drainage.** Do existing roof drains and roof slopes provide appropriate water

drainage? If so, the roof might be a candidate for a recover. If not, and puddles remain on the roof for days, there is no need to continue pondering: Replace the roof. Nothing is more important than getting water off the roof.

**Performance to date.** If the roof has been leaking for some time, chances are the insulation or structural deck under the membrane is no longer sound. Covering wet insulation or a deteriorated deck might cause the damage to worsen. The best course of action where any roof elements might be in questionable condition is to replace the roofing system.

**Existing membrane.** How does the existing membrane look? If it seems a little dry, that is fine.

But if it resembles a patched sail flapping in

the wind, recovering will not work. An important aspect to recovers is that there will be no warranty for what is being covered. The recover system typically is only warranted for its own properties and ability to adhere to the substrate. That means that if an old roof membrane with a nice, new recover flies off, that is not a recover product manufacturer issue. It is a building management problem.

**Building code.** Is a roof recover permitted under the prevailing code requirements? For example, the 2015 International Building Code (IBC) excludes the following conditions from receiving recover systems:

“1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.

2. Where the existing roof covering is slate, clay, cement, or asbestos-cement tile.

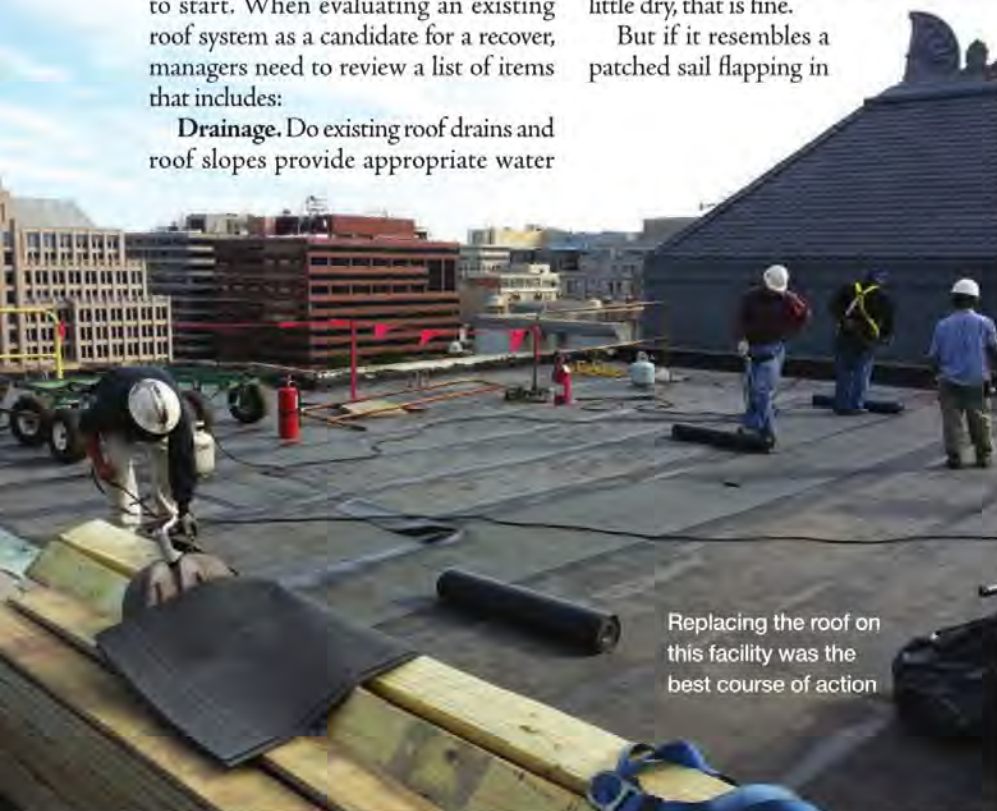
3. Where the existing roof has two or more applications of any type of roof covering.” (IBC 706.3)

The most likely existing roof systems that are candidates for recovers are those that have performed well to date and are approaching the end of their warranty periods. Managers should review a recover as a means to prolong the life of an existing roof membrane for five to ten years, not as the equivalent of a new roof system.

## Recover options

Recover options can be categorized by their chemical composition. Acrylic, polyurethane and silicone coatings provide varying degrees of tensile, impact and ponding water resistance, and their costs vary. Additional recover options include polyurethane-methacrylate (PUMA) and polymethyl-methacrylate (PMMA) systems, which are two-component, catalyst-cure membranes that include a fleece reinforcement.

Modified bitumen roof (MBR) membranes can receive liquid-applied systems but are also candidates for installation of new bitumen-based cap sheets. One consideration for MBR systems is whether



Replacing the roof on this facility was the best course of action

PHOTO COURTESY HOFFMANN ARCHITECTS



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the existing cap sheet has a granular or smooth surface. A granular surface requires that the existing cap sheet be heated so the granules become embedded within the bitumen before application of a recover product.

A prerequisite for all roof recover options is the ability of the new material to bond to the existing. Manufacturers have acceptable membrane substrates for their products, but, a field test conducted by the manufacturer to confirm project-specific conditions and compatibility is highly recommended.

### Roof replacement

Compared with a recover, a roof replacement entails greater expense and effort. A full roof assembly replacement goes beyond the roof membrane and includes considerations for insulation, fire classification, wind uplift, and structural roof deck and diaphragm performance. Modern building code requirements are more stringent than those 20 years or even 10 years ago. So when planning a roof replacement project, managers should be aware of these considerations:

**Structural diaphragm analysis.** Depending on governing code, a licensed engineer might need to analyze the structural diaphragm of the roof and roof-to-wall connections for compliance with wind loading as specified in the IBC.

**Insulation thickness.** Current energy conservation building codes can include minimum insulating requirements ranging from R-2- to R-30. Where the existing roof deck is flat and tapered insulation creates the required slope to drains, insulation depth can be significantly more than 6 inches in some

areas. If existing building elements, such as low parapet walls or penthouse thresholds, were designed for a roof system with 2 inches of insulation, these components will need to be modified to accommodate the new finished roof level.

**Drains.** Managers should analyze existing drains to confirm that their location and sizing appropriately accommodate rainfall for pre-design. The replacement of drains and the addition of new drains when necessary requires access to the underside of the roof deck. Suspended or finished ceiling will need to be removed and reinstalled accordingly.

### Selecting a new low-slope roof

Once a manager has weighed the options and elected a roof replacement approach, the next point of discussion is the type of roofing system and membrane. Although it might be simplest to stick to what a manager knows, an analysis of current needs and new code requirements is advisable. When selecting an appropriate roof membrane system, managers need to consider roof usage, environmental factors, and budget, among other design criteria.

Roof systems that serve as supplementary spaces for tenant activities require a robust assembly that provides protection for the membrane and a surface for foot traffic. This system likely will be an inverted or protected roof membrane assembly — IRMA or PRMA — where insulation and overburden are installed on top of the membrane. Membranes appropriate for these systems include multi-ply bitumen, hot-applied rubberized, and reinforced liquid resin.

Green roof assemblies create an environment where water is consistently introduced to the overburden and where root systems prod lap seams between membrane sheets — not ideal in waterproofing. The heavy overburden creates a logistical and financial burden if leaks occur. Managers can mitigate these factors through the use of a seamless application, such as those provided by liquid-applied resin systems and hot-applied rubberized systems.

Roofs that serve solely as a waterproof cap to a building provide an opportunity to use the largest variety of membranes. Multi-ply bitumen systems, hot-applied rubberized systems and reinforced liquid resin systems provide superior performance, but less expensive options might provide near-equal performance.

Traditional or exposed membrane assemblies allow for budget-friendly single-ply systems, but managers should be aware that manufacturers provide single-ply membranes in different thicknesses.

Over time, foot traffic, water flow, ultraviolet radiation and exposure to the elements will erode the membrane surface. The thicker the membrane is, the longer it lasts, but this maxim is specific to the membrane material and does not take into consideration the roof installation and detailing, the performance of which rely on educated design and quality workmanship.

Environmental factors also might dictate or influence the use of a particular membrane type. For example, chronic exposure to caustic exhaust demands a membrane with suitable chemical properties, which will not prematurely deteriorate when subjected to the extreme environment. Caustic deposits require the use of membranes with a composition that has been tested and proven resilient to such exposure, such as a polyvinyl chloride (PVC) or ketone ethylene ester membrane.



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# Ask the Drain Brains

By Marty Silverman, General Pipe Cleaners

Price points for roof membranes vary. Generally, single-ply membranes are comparatively low-cost systems with basic labor demands for installation. Multi-ply systems provide added redundancy, something always sought after in waterproofing and typically price higher than single-ply systems. Liquid-applied resin systems and hot-applied rubberized systems are commonly the highest priced assemblies, requiring onsite material preparation and labor-intensive installation but providing a seamless waterproofing membrane.

## Best practices

Managers can use best practices to set up, verify and preserve the quality of a new roof. During the design phase, manufacturer visits, adhesion testing (for roof recover), and mockups are instrumental for quality control. For recover projects, infrared and capacitance testing can confirm that existing assemblies have not been compromised by water. If testing reveals limited water damage in the system, targeted repairs can be made before the recover application.

Following installation of the recover or new roof, installers should provide manufacturer maintenance guidelines. This literature includes information on the timing of routine inspections, what to look for during roof evaluations, general care and upkeep recommendations, and directions for notifying the manufacturer of issues.

Typical roof inspection items include: signs of stress; including wrinkles and blisters; evidence of mechanical abuse, such as punctures and cuts; unusual wear due to excessive foot traffic; and evidence of damage caused by chemical attack or other adverse reaction to substances.

Maintenance recommendations might include keeping the roof free of debris that might cause damage, cleaning the membrane with low-pressure water or soft-bristle brooms, and maintaining clear drains and scuppers. ■

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## Solving basement flooding problems

**Q. We maintain apartment buildings by the river. When heavy rains come in the spring and fall, the river rises, causing basement floor drains to back up. Is there a device that can prevent a major mess?**

A. Yes, you have two options. There are a number of water sensors on the market that will detect water on the floor and sound an alarm. But by the time you know you have a problem, it's too late. The water is already on the floor.

A better alternative is a device called a Flood-Guard. It operates like a check valve to seal off water back-up caused by overloaded sewers. Water flows normally through the drain until the sewer begins to back up. Then a float rises to seal off the drain opening until the water recedes.

A screwdriver and a couple of minutes are all you need to install a Flood-Guard. Once in place, it can prevent property damage and a very messy clean-up job. It's available for 2", 3" and 4" drains.

For extreme, extended pressure, a standpipe model is recommended.

The 4" Standpipe model is threaded to receive 1-1/2" IPS pipe. On the 3" model, the pipe is slipped through the rubber gasket before the screws are fully tightened.



The Flood-Guard works well for floor drains, but it cannot be used to prevent a toilet from backing up and overflowing. And of course, if the water is coming in under the front door, it's too late for the Flood-Guard.

For more information, or to ask a question, visit [www.askthedrainbrains.com](http://www.askthedrainbrains.com) or email [info@drainbrain.com](mailto:info@drainbrain.com).