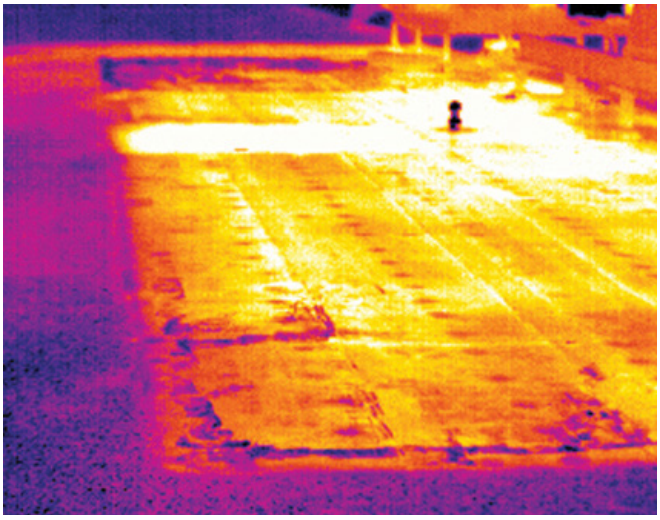
Buying Time

By Tom Stuewe

Virtually everyone understands that a nominal investment in regular oil changes is essential to achieving the warranted service life of their automobile. But when that same concept is applied to roofing, there are a lot of myths out there, e.g.:

- If a roof is installed correctly, it should be maintenance free.
- With a 20-year warranty, there's nothing to worry about.
- Stop throwing good money away after a bad install and just replace the roof.

Such myths run contrary to good roofing practice in the best of times. In a tough economy, such as the one we are facing today, embracing such simplistic reassurances can be disastrous. This article provides some general guidelines to help facility managers and building owners identify when a roof is worth restoring, and more importantly, what simple steps can be initiated at any point in a roof's service life to extend its life-cycle performance until funds for eventual and inevitable replacement are available.



Preventive maintenance (PM) that makes a good roof better is far more cost-effective than neglect. But that does not mean that all neglected roofs are unsalvageable. If economic uncertainties have forced you to forego annual inspections and routine maintenance, it's not necessarily too late to turn things around. A thorough roof inspection is the first step for determining whether a neglected roof can be restored rather than replaced.

What to Look for When Inspecting Roof Systems

As a rule of thumb, it is typically more economical to replace a failing roof than to restore it when a majority of its insulation has been saturated. Only a non-destructive moisture scan can definitively identify the degree of water penetration and whether the roof is worth restoring.

For every major category of roof, there are a handful of indicators that suggest a roof is beginning to fail — in which case an infrared scan might be advisable. These indicators include:

- History of leaks and the age of the roof system
- Evidence of mechanical damage
- Flashing slippage or other indications of flashing damage
- Sloppy details
- Excessive ponding which can lead to water infiltration

In addition, each roof category has a few symptoms unique to it, which are among the most common indicators of failure.

For Single Ply (EPDM, PVC, TPO, CSPE)

- Holes, tears, splits, or abrasion
- Ridges and buckles
- Open laps and splicing
- Localized/wide spread membrane deterioration
- Fastener back out
- Membrane shrinkage
- Membrane abuse or wear and tear
- Excessive debris or vegetation
- Surface coating deterioration

For Metal

- Rust
- Missing fasteners
- Fasteners that are backing out
- Open laps
- Leaks at penetrations

For BUR and Modified Bitumen

- Fishmouths and buckles, wrinkles or blisters
- Open laps
- Deteriorated membranes
- Flashing slippage or other indications of flashing damage
- Damaged edge metal, expansion joints, or transitions

It is useful to remember that roofs do not wear uniformly. It is essential, when inspecting and testing them, that you examine the perimeters and penetrations as well as the surface field.

When Restoration is an Option

If it is determined that restoration is viable, it may be useful, before you start, to have a clear understanding of how restoration systems could fail if not installed correctly:

- Improper surface preparation
- Improper application, e.g., applied at temperatures higher or lower than recommended
- Poor specifications, e.g., chemical incompatibilities between the coating and the substrate
- Lack of inspections to ensure to-spec installation
- Equipment malfunctions that can affect the consistency of the material
- Bad material formulation

Because of the growing complexity of coatings solutions available today, it is becoming increasingly challenging for facility managers to

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ensure a material selection appropriate to the requirements of their specific application. But that is only half of the story. In addition, VOC regulations have been becoming more stringent since the 1990's. With the stricter regulations, building owners began transitioning from solvent-based technologies with proven performance to water-based technologies that are newer to the industry. As VOC regulations become increasingly stringent, this trend is likely to continue.

Clearly, a project-specific specification written by a roofing professional is your best protection against future failure. Once a proper restoration system has been identified, follow these guidelines to optimize its service life:

For BUR and Modified Bitumen

- Conduct an infrared scan to identify wet insulation prior to attempting to restore a roof
- Cut out wet areas and replace them with similar materials
- Repair/replace all flashings, scuppers, drains, penetrations, and curbs
- Repair all ridging, blisters, and fishmouths
- Install crickets to eliminate any ponding
- Caulk joints in coping stones
- Install restoration system
- Install reflective surfacing or new gravel

For Metal

- Wipe surface with solvent or use high-pressure (1000 psi) water and detergent to free it of chalk, dirt, and other contaminants prior to coating
- Remove deteriorated paint or flaking paint using a high-pressure wash and Society for Protective Coatings (SSPC) SP #2 (hand tool) or SSPC SP #3 (power tool) cleaning kit or an SSPC SP #7 Brush Blast
- Remove any rusted areas and flaking rust using SSPC SP #2 or SP #3; then prime within four hours of cleaning
- Sand down any glossy surfaces to a dull finish
- Apply coating per manufacturer's specification and coverage rates

Performing an adhesion test (ASTM D 3359) is the safest method for determining whether a metal surface is clean enough for your coating.

For Single Ply (EPDM, PVC, TPO, CSPE)

- Conduct an infrared scan to identify wet insulation prior to at tempting to restore
- Cut out wet areas and replace them with similar materials
- Repair/ replace all flashings, scuppers, drains, penetrations, and curbs for a watertight flashing system
- Caulk joints in coping stones
- Secure and seal coping caps
- Apply coating per manufacturer's specification and coverage rates

For non-metal surfaces, performing the adhesion in pull test (ASTM D 903) or cross hatch test (ASTM D4541) can help you determine whether your non-metal roof is clean enough for your coating.

Other Factors Affecting Restoration Coatings Performance
It should also be noted that regardless of the roof type, using the wrong application method is another factor that can adversely affect a restoration coating's performance. It is advisable to review with your contractor all manufacturer recommendations in relation to the application of their product. Short cuts are likely to cost both time and money in the long term. Finally, there are seven distinct curing mechanisms for restoration coatings, any one of which can create adhesion problems if manufacturer guidelines are not properly followed.

What to Do to Extend Service Life

Once you've bought some time by restoring your aging roof to an appropriate service life (typically, restorations are warranted for anywhere from five to 10 years) — routine preventive maintenance will help ensure that it lasts as long as you need it to last.

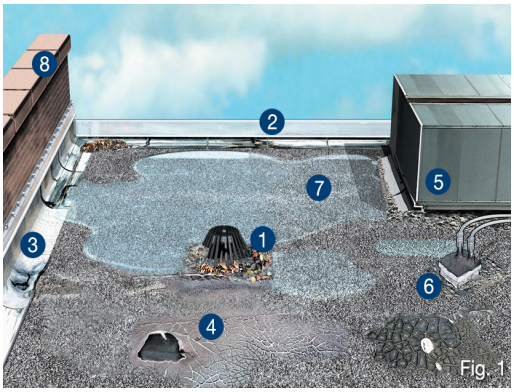

Fig. 1

By training your maintenance team to perform the following 10 routine procedures on every roof at least twice each year, you can be confident that a comparatively nominal maintenance investment will buy you the time needed until you are able to make a capital investment in a replacement roof.

1. Drainage Systems
2. Perimeter Details
3. Flashings
4. Roof Field
5. HVAC/Rooftop Equipment
6. Penetrations
7. Surfacing
8. Parapet Walls
9. Seams (Figure 2)
10. Fasteners (Figure 3)

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1. Clean Roof Drains. Roof drains clogged with debris cause ponding. Standing water can eventually penetrate the membrane through seams or UV-damaged seals, causing leaks and/or mold.

2. Check the perimeter for cracks or splits. Your roof's perimeter takes much of the stress related to repetitive expansion and contraction cycles. As metal components such as edge details shift, the surrounding roof area can crack or split. Discovered early, such problems can be repaired before water penetration of the insulation and your building's interior can occur.

Fig. 2

3. Inspect and repair flashings. According to Factory Mutual Insurance, 80 percent of construction litigation involves water damage and 90 percent of that damage started with a water leak at the roof edge. Flashings are generally acknowledged to be the single most vulnerable component of your roof system. Regular inspections help ensure that areas where the membranes or panels are joined to dissimilar materials remain intact and impervious to water penetration.

4. Inspect the roof field and repair emerging cracks or blisters. The roof field takes the most direct hit from UV and weather, as well as the stress of occasional foot traffic. Promptly and diligently fixing problems such as cracks and blisters will protect the energy-saving value of your insulation and keep your buildings dry.

5. Inspect HVAC and other rooftop equipment. Rooftop equipment is frequently the site of water penetration, as seals disintegrate and/or are damaged by worker traffic and equipment over time. Inspecting where your rooftop equipment adjoins the roof surface ensures early detection and repair.

6. Inspect all penetrations. Areas where vents, plumbing, or other utilities are routed from the roof or exterior wall directly into your building are similarly prone to damage. Inspecting and repairing all penetrations regularly, and resealing them as necessary, can keep your buildings leak free.

7. Inspect and maintain surfacing materials. Whether coatings, minerals, or gravel, the surfacing of your roof takes tremendous abuse from the sun, weather, air pollutants, and from chemicals or other discharge escaping onto the roof from your building's interior. Discovering compromised areas early can preserve the integrity of your roof system.

8. Inspect parapet walls and copings. The cracks and minute separations along mortar-joint bonding lines and metal caps are vulnerable to water penetration if not routinely inspected and treated for damage.

9. Inspect and repair seams. Single-ply roofs, as well as some other low slope roof systems, are always vulnerable at their seams, primarily due to the stress of repeated expansion and contraction cycles. Early detection of problems such as open laps can prevent costly replacement of damaged insulation.

10. Inspect and repair or replace fasteners. For metal roofs, fasteners that penetrate the system can invite water penetration if improperly sealed. Since even the most rugged sealing composites deteriorate from UV and weather exposure over time, regular seal inspections and repairs are critical to the longevity of metal roof systems.

Conclusion

Tough economic conditions sometimes result in imprudent choices. Whatever the current condition of your roofs, it is never too late for damage control. Thorough inspection can reveal whether restoration is an option, helping you buy time until replacement is feasible. Once restored, using quality materials, undertaking routine preventive maintenance will ensure the warranted service life of your restored roof is achieved. To help you identify your roofing options, contact a quality manufacturer or design professional to design specific guidelines and a specification tailored for your particular project.

Tom Stuewe has more than 14 years of experience in the building industry, helping to develop industry-leading restoration coatings, low odor, low VOC membrane adhesives, and plaza deck systems for the commercial building envelope. In his role as a product manager for The Garland Company, Inc., Stuewe is also responsible for training Garland's field team in the proper application and maintenance of coating and restoration systems. Stuewe graduated from The Ohio State University with a degree in construction management. Garland is a Cleveland-based manufacturer of high-performance solutions for the total building envelope.

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