

Evolution in the Repair and Restoration of Aged EPDM Roof Systems

By Ron Goodman

Good roofing practice has always been to tear off an existing roof to the deck and replace it with new material, but that is beginning to change. The time has come in which tearing off an older roof may not be the best choice for either the building owner or the environment.

Sustainability, the latest buzzword in the commercial roofing industry, is fueling the desire of building owners to minimize resource consumption and reduce landfill usage. The advent of several forensic diagnostic tools available to roof consultants is consistent with the trend of minimizing waste and extending the life of existing materials. Now more than ever, consultants can provide their customers with multiple options when their roof systems are in need of repair.

Consultants are increasingly turning to technologies such as infrared and nuclear moisture scans, moisture meters, fastener pull-out equipment, insulation density tests, and GPS tools to help them determine the best option for aged roofs. When these tools are used in conjunction with thorough energy analyses and lifecycle costing, the best solution becomes clear. With these technologies, consultants have the upper hand in providing their clients with the most logical and economical roofing solutions for their aging roof systems.

All of these testing methods and technologies could not have come at

a better time. Over the past 45 years, EPDM single-ply roof systems have grown considerably in market share compared with their modified bitumen and built-up competition. As a result, there are many aging EPDM roofs, and consultants will be faced with the task of providing cost-effective, durable solutions to keep the roofs in proper working order without tearing them off entirely.

Several factors come into play and impact consultants' decisions regarding the end of a roof system's useful life. Thermal

bridging, proper drainage, R-value, surface color, wind uplift, and hail resistance are all important factors to consider. When everything is taken into account, consultants are faced with two primary choices when addressing an aged EPDM roof besides a complete tear off and replacement: restoration and re-cover.

1. EPDM roof restoration usually encompasses reworking the flashings, seams, and terminations,



Finished view of Martinson Elementary School in Marshfield, Massachusetts. FleeceBACK applied directly over EPDM using FAST Adhesive made this roof as good as new.

while leaving the field membrane in place. EPDM is well known for its long-term weatherability, so in most cases the field membrane has life remaining. This option is used primarily when the owner wants to extend the life of the existing roof or warranty coverage for an additional five to ten years.

2. EPDM roof re-covers provide the ability to address more issues than typical restorations. Proper drainage, thermal bridging, enhanced R-value, altered surface color, as well as enhanced wind uplift and hail resistance, are all issues that are better addressed with a roof re-cover.

In order to meet building owner needs, professional roof consultants are becoming fully educated on energy spending, environmental issues, and restoration choices. Each facility should be analyzed for a myriad of material choices and should be considered with regard to structure type and use. Geographic location of the building relative to cooling and heating degree days, surrounding buildings, wind, fire, the existing maintenance program, maintenance budget available for washing the roof, and insurance are just a few of the basic considerations that must be considered when determining how to address an aging roof.

The remainder of this article is focused on accepted practices when considering an EPDM roof restoration or re-cover. Both options require a thorough investigation and that all wet insulation be removed and replaced.

EPDM Restoration

Because of today's environmental concerns, consultants may justifiably choose to restore an existing roof instead of going through replacement or full re-cover. Restoring single-ply systems can be the



Cover an existing built-up roof and add thermal value by applying additional insulation under the EPDM membrane. The sheeting shown has factory-applied (seam) tape for faster installation with greater peel and shear strength.

most prudent thing for a building owner to do. The life cycle should not be counted until the usable life of the roof is really over, and many single-ply systems are providing serviceable life well beyond 20 years of age.

When considering restoration options, one must take into account the type of membrane. If a building owner originally selected an economical membrane such as

a 45-mil sheet, then the restoration process may require a roof coating to extend the life of the sheet in addition to stripping in the seams and redoing the flashings.

Over the past several years, coating technology has advanced significantly. Today's coatings are considered viable solutions to aged, but not failing, systems. Many roof coatings feature additives that have

"After large roof areas are re-covered or replaced, the ballast can be reloaded onto the roof by reversing the vacuum and pumping it back to the rooftop."



Acrylic coatings such as the one being sprayed on here can help extend the life of an old EPDM roof system (Photo courtesy of United Coatings)

improved the coatings' weatherability, reflectivity, and long-term capabilities. These coatings often come with warranties that cover the products' reflectivity and performance, providing buildings with years of protection and extended service life.

For buildings that feature a thicker, more premium membrane such as a 60-, 75-, or 90-mil sheet, restoration procedures may only have to address the seams and flashings. Coatings can still be used to enhance reflectivity, but in many instances, they are not necessary to enhance the field membrane's performance. The old adage of "pay me now or pay me later" holds true when it comes to the thickness of some roofing materials, and it is encouraging that building owners are increasingly recognizing the benefits of thicker membranes.

When redoing seams and flashings, nothing is more important than proper membrane preparation, regardless of its thickness. The accepted method of membrane prep for the area to be stripped in is to scrub the area using warm water and a low-sudsing soap such as Spic and Span®, Tide®, or Lestoil®. After the membrane has been washed, it must be rinsed with clean water and given time to dry. Next, a weathered membrane cleaner and primer coat of splicing cement must be applied prior to installing a cured EPDM cover strip that will ultimately waterproof the seam.

For fully adhered systems with large areas of delamination, the primary restoration procedure involves adhering a reinforced universal securement strip (RUSS) to the existing membrane and then mechani-

cally fastening it at 12 inches on center. RUSS is available in standard and self-adhering options. It is utilized in perimeter securement on mechanically fastened, fully adhered, ballasted, and metal retrofit systems and can also be installed horizontally and vertically with seam-fastening plates below the EPDM deck membrane for additional securement or in conjunction with gravel stops and edging details. Many contractors favor this option over installing narrow-width perimeter sheets to meet wind-uplift requirements.

After installing the fasteners and plates, the upgraded attachment is stripped in with cured cover strip. For an area with a small amount of delamination, fasteners can be installed directly through the existing sheet and then stripped in with cured cover strip.

For mechanically fastened systems, any loose or tented fasteners should be replaced or re-secured prior to completing the strip-in process outlined above.

The restoration procedure for ballasted systems is similar to the fully adhered and mechanically attached method; however, the stone must first be removed from the areas in need of repair. It should be noted that rakes or shovels should not be used, as they can damage the field membrane. A gravel pusher or push broom should be used to clear approximately 12 inches of area on each side of the splice. After the splice has been exposed, the same strip-in procedures outlined above can be followed.

For large restoration or full re-cover projects, many contractors utilize a vacuum method to efficiently remove ballast from the roofing system. This method utilizes a Hydro-Vac (industrial vacuum) that sucks the ballast from the roof and into a truck or tank on the ground. After large roof areas are re-covered or replaced, the ballast can be reloaded onto the roof by reversing the vacuum and pumping it back to the rooftop. This method creates less dust and debris within the building and the surrounding environment, while allowing the ballast to be easily reused.

EPDM Roof Re-cover

This option is primarily employed on adhered and mechanically fastened systems and is an exciting development in the roof-repair industry, providing the opportunity to address more building issues than a typical restoration. Through today's innovative energy-analysis software, it has been noted that most buildings in the United States are under-insulated. This is important in that the cost of energy has gone up dramatically in the past 10 to 15 years.

Re-cover options afford the opportunity to add more insulation to the rooftop without having to tear off the original material. The insulation can be fastened in place or, in some cases, adhered directly to the existing material with a two-component urethane adhesive. With the recent advancements in insulation product offerings,

drainage issues can also be addressed with tapered insulation or crickets prior to the installation of the new membrane.

Altering the color of a building's rooftop is also easier in a re-cover than a restoration. If a building has a black roof in the south (where there are more cooling degree-days than heating degree-days), it makes sense to consider re-covering the system with a white membrane. Conversely, if one has a white roof in the north (where there are more heating degree-days than cooling degree-days), a black roof re-cover could be the answer.

The emergence of fleece-backed technology (a single-ply membrane matted to a fleece material) has advanced the roof re-cover industry. These membranes are an excellent choice for a roof re-cover, as the fleece acts as a separator between the new membrane and the old membrane, while providing increased puncture- and hail-damage resistance.

This method has been popular for several years when re-covering asphalt-based roofing systems, and the technology has recently been extended to single-ply sys-

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Whether it's EPDM or TPO, re-cover projects require most of the same procedures as standard roof installations.



tems. In many cases, the existing EPDM membrane can be power washed, and then a fleece-backed membrane can be adhered directly to the old roof. One can think of this as a two-ply system that provides dual protection yet is still much lighter in weight than many of the alternative multi-ply roofing systems. Fleece-backed membranes are typically available in both EPDM and TPO options of varying thicknesses.

Another option gaining popularity is a roof-garden re-cover. This allows a new membrane to be loose-laid on top of the existing system and then covered with a traditional or modular garden system. Roof gardens not only provide an aesthetically appealing option, but also help reduce a building's stormwater runoff and lower its overall energy cost. Roof gardens can add significant weight to the structure, so a structural analysis should be performed before they are implemented.

As the market for single-ply has grown over the years, there is an expanding body of knowledge, techniques, and design options available to building owners who are looking to protect their assets, maximize their return on investment, and be in sync with the sustainability movement. Restoring or re-covering an existing roof system

makes sense because the owner and the environment receive numerous benefits. In addition to the obvious advantage of a watertight roof, other benefits of a re-cover or restoration include extended service life, less waste generation, less ozone depletion, little disturbance to building operations, and the financial advantage of incurring minimal maintenance costs versus large-scale capital expenses for full replacement.

Investigative tools have improved dramatically over the past decade, and investigation techniques are beginning to follow suit. In the future, system and material choices will be based on how the roof space will be used. As consultants continue to become familiar with the latest technologies, the process of tearing off an existing roof may become less and less appealing. 

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