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GOING OVER YOUR HEAD

Choosing the right roof for your retail store.

Noel Cupkovic



A roof's condition is rarely at the forefront of most maintenance and facilities directors' minds. That is, until a problem occurs, which, usually by the time it is noticed, has already caused serious damage to the roofing system. Learning more about the roof system you have or will install and setting up a plan of action can not only help minimize costly repairs but increase its longevity. The result is a reduced overall life-cycle cost — spreading out or amortizing the initial expenditure and subsequent maintenance expenses over a greater number of years — which translates into more value per dollar.

PREVENTIVE MEASURES: SET UP A STRATEGY

Whether the roof is existing or newly constructed, you should set up a strategy for preventive maintenance. For an existing roofing system, schedule an inspection and roof survey to evaluate the condition of the roof and to determine if any repairs or maintenance need to be done. Begin a file, incorporating any original information, warranties, draw-

ings or repair documentation and adding the new inspection results along with any other pertinent data obtained.

REGULARLY SCHEDULED INSPECTIONS

"The key element to a long-lasting roof system is inspections twice a year," says Tom Case, special projects manager with W.P. Hickman Systems, Inc. "Somebody who knows what to look for can take care of so much just by walking the roof twice a year — no matter what the roof system type." While certain roofing systems better lend themselves to a longer life cycle through ease of repair, any system that is regularly inspected and maintained is going to outlast those that aren't.

INFRARED THERMOGRAPHY SURVEY

A visual examination by a roofing professional can be complemented by a nondestructive survey analysis. One of the most cost-effective and widely used of these techniques is infrared thermography. This method measures temperature differentials on the roof's surface. If hot spots or heat loss are detected through the roof surface, it can be an indication that the insulation is damp, since moisture diminishes insulation's effectiveness. Locating these hot spots can assist in locating potential leaks and other problem areas.

This technique measures the entire roof's surface and not just a sample, as some other survey methods do. Therefore, it can also help determine whether a problem is localized and repairable through standard maintenance or if the problem is more widespread, requiring an overall removal and replacement of the existing roof. For about 3 cents per

square foot of roof, the infrared thermography survey can offer outstanding peace of mind and prevent a developer from wasting money on fruitless repairs.

ABOUT ROOF SYSTEM TYPES

When constructing a new roof, learning the strengths and weaknesses of each roof type will better equip you to make initial decisions about the type of material to install. Learning about your existing system will enable you to anticipate potential concerns and make appropriate modifications that may be necessary to extend the life of the roof.

There are two major commercial flat or low-slope roofing systems used on retail development projects. They are the single-ply membrane system and the built-up roof (BUR) system. Each system has its own advantages and disadvantages that affect initial roof system selection (or replacement) and ongoing repair and maintenance aspects.

BUILT-UP ROOF SYSTEMS

The BUR system involves building up multiple layers of roofing felt, utilizing asphalt or coal tar as an adhesive agent. The BUR requires additional labor and is initially more expensive than the single-ply membrane system. Because of the multi-layer design, which makes it heavier and more durable, as well as the ease and variety of methods for repairing it, the BUR system has a long life span — usually around 20 years.

BUR systems offer a particular advantage to mall developers in that it is possible to make numerous perforations in and through the multiple layers without detrimentally influencing the overall integrity of the system. "This is es-

pecially important with malls," says architect Joe Chura of KA Inc., Architecture, "since often mall tenants come in after the mall is completed and need to make modifications on the rooftop."

Because it can better handle the vast temperature differentials and more extreme weather conditions, the BUR system is also a staple of the East, North and Midwest United States. Conversely, the South and Southwest do not require as heavy a system or one with the same level of water-tightness as a BUR offers.

"In Southern California the weather is mild — the rain comes in seasons and the temperature variances aren't as great — so you can get away with a much lighter weight [single-ply] system out there," explains Chuck Heidler, manager of professional services at W.P. Hickman Systems, Inc. "If you put that same [light-weight, single-ply] roof up in Minnesota, you'd be lucky to get five years out of it."

Heidler goes on to explain that con-

struction preferences in the Southwest also affect roofing system choices. "You get a tremendous amount of plywood deck used — even on commercial buildings — which cannot handle the weight loads of BUR systems like the Midwest," where steel decks are more prevalent.

There are several maintenance and repair options available for BUR systems, which serve to increase the product's longevity. One reason there are so many options is that the asphalt and coal tar are compatible with a variety of products. Also, it is a rather simple procedure to add another layer of roofing felt and asphalt or tar over the existing surface.

SINGLE-PLY MEMBRANE SYSTEM

The single-ply system is created with just a single ply of a chemical membrane usually comprised of EPDM (ethylene propylene-diene monomer), PVC (polyvinyl chloride) or hypalon. EPDM is by far the most

frequently used and least expensive of these membrane types. It has a lower initial cost than the BUR system as a result of the reduced labor required for installation — one ply versus three or four with a BUR.

"In new construction we're seeing single-ply more often used because of the marketing efforts that are taking place with specifiers," explains Chuck Fitzgerald, manager of marketing and sales with W.P. Hickman Systems, Inc. "It's the least expensive first cost that you can put on the building." The single-ply roof usually lasts about 10 years, and despite the shorter life span, the low initial cost may be more appealing to retail developers who plan to sell, move or redevelop a location in that time-frame.

Low initial cost is a primary advantage to this roofing system, but other benefits — especially in areas of the country where sunlight and heat can become a burden to HVAC systems — are that white-coated PVC materials can be used

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to reflect the sunlight and reduce heat absorption. These products are more lightweight with greater flexibility, since the EPDM is a rubber product (stretches and comes back into shape easily) and the PVC is a plastic product (stretches to fit and holds its shape).

Problems arise when these products are used in an area of the country with high precipitation. Each time a single-ply membrane is perforated — for example, to modify for a mall tenant — the system is compromised, increasing the potential for leaks and damage. While the membrane



New parapet construction with an EPDM membrane on the vertical surface and new modified bituminous roofing on the existing sloped surface, with metal transition flashing between (Wayne Hills Mall, Wayne, New Jersey).

can be patched, the contractor must be certain to exactly match the original material (e.g., EPDM cannot be patched with PVC), which is not always easy to determine without original paperwork, for the repair to hold.

MODIFIED BITUMINOUS BUILT-UP ROOF SYSTEMS

A third alternative growing in popularity is a hybrid of the two systems known as the modified bitumen system. Several types of membranes composed of modified asphalt are available and can be applied in a single- or multi-ply system offering some of the best aspects of each one.

OTHER ROOFING SYSTEM COMPONENTS

While the field surfacing materials determine the roof type, roofing systems include many other critical components such as insulation/vapor barriers, vents and drains, expansion joint covers, mechanical fasteners and flashings. All of these affect the performance and life span of roofing systems and pose the greatest risk for potential leaks.

Case suggests taking as much, if not more, care in selecting and specifying these items. In addition, his firm encourages its clients to use multi-ply flashings even when single-ply membranes are used elsewhere on the roof. Match the outer layer of the flashing materials to the system membrane used for the roof field, then utilize at least



BUR system at The Promenade in Temecula in Temecula, California, showing flashing prior to installation of OSB, rigid insulation substrate.

one layer beneath it as a reinforcement/insulating layer.

"We know where the problems are going to be — it's not like this is a mystery," he explains, "that is where most of the leaks are going to occur over time." Planning ahead and spending more up front for a two- or three-ply flashing may mean less money spent trying to locate, repair and replace leak-damaged materials later on.

ITEMS TO WATCH FOR

Moisture is the predominant enemy of a roof. Great attention should be given to where ponding or ice damming (icy build-ups) occur. Standing water, snow and ice should be removed from the surface. Roof drains should be checked and cleaned frequently. If water seems to be ponding and the problem is not the drains themselves but routing the water to them, temporarily fix with siphon accessories. Building up the roof to a slight slope with tapered insulation and roofing membranes to better direct the water to drains is a more permanent solution.

On single-ply membrane roofs, be mindful of seams to assure complete adhesion. Watch for evidence of punctures, which are often hidden in the EPDM materials. With BUR systems, watch for cracks, punctures, splits or areas where roof felt may be exposed. This can cause leaks into your building. Flashings and areas where the roof and building come together are also areas that should be watched closely. Locate breaches and repair them as quickly as possible.

AESTHETIC ROOF DETAILS

As opposed to the functional flat or low-slope roofing systems, standard seam, slate and wood shingle materials are used primarily to accent a retail project and do not contribute to a roof's overall composition. The materials require great attention during installation and have a higher risk of leaking than flat components. The key to successfully incorporating these materials into the design without compromising the roofing system is coordination of trades.

"You might have the best flat-roof crew involved for the majority of the project, but if you are putting standing seam or copper or glass in, you've got different crews who probably aren't paying attention to how these things are fitting together — the details suffer," says Fitzgerald.

"That's where you need the coordination between all parties," confirms Case.

The careful selection of a system and materials coupled with proper transportation, storage and installation of those materials is a good foundation for a long-lasting roof. Setting up a system for inspection, record keeping, maintenance and repairs will add to that longevity. Waiting until you see a problem will only cost you more money and increase the deterioration of your roofing system. **PRSM**

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